Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
AT&T Petition to Launch a Proceeding	)	
Concerning the TDM-to-IP Transition	)	GN Docket No. 12-353
	)	
Petition of the National Telecommunications	)	
Cooperative Association for a Rulemaking	)	
to Promote and Sustain the Ongoing	)	
TDM-to-IP Evolution	)	
	)	

COMMENTS OF XO COMMUNICATIONS, LLC ON PETITIONS OF AT&T AND NATIONAL TELECOMMUNICATIONS COOPERATIVE ASSOCIATION

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SUMMARY

The evolution of the circuit-switched public switched telephone network ("PSTN") toward a packet-switched, Internet protocol-based ("IP-based") public communications network ("PCN") is already underway in XO's network and in the industry at large. The Commission can and should address this evolution using the technology neutral framework established by the Communications Act of 1934 (the "Act"), as amended by the Telecommunications Act of 1996 (the "1996 Act"), as well as its own existing regulatory tools adopted to promote continued competition. In light of this well-established regulatory regime, the Commission should not initiate either of the two comprehensive proceedings envisioned by AT&T and NTCA, respectively. Rather than being guided by the overarching question AT&T poses – when is a good time to stop regulating the networks of AT&T and other incumbent local exchange carriers ("ILECs") as their networks become increasingly IP-based – the Commission should focus on enforcing its existing pro-competition rules and policies, addressing relevant issues in pending proceedings, and modernize its rules when necessary consistent with that same pro-competitive rubric.

The premises of AT&T's Petition are fundamentally flawed. While the industry is moving to all-IP networks (some participants more quickly than others), the industry is not moving to a convergence where all communications traverse the public Internet, as AT&T suggests. Rather, the public Internet, which operates on a "best efforts" basis, and managed IP-based communications – such as managed IP voice – will remain distinct for the indefinite future, primarily because of the need to support and maintain quality of services, particularly in the business/enterprise markets. This is true, even though the PCN that will be used for managed IP voice communications and the Internet might share some of the underlying physical facilities, such as those that allow for subscriber access to the PCN and the Internet. While the PSTN has

had a long history of incorporating new technologies and facilities to improve services and make network operations more efficient, these changes have not dictated the need for fundamentally different regulatory regimes. NTCA recognizes that the current evolution toward an all-IP network is "a technology shift within a network (or, really a series of interconnected networks)," and that the core objectives of the Act "must apply with equal force" regardless of the technology by which services are rendered. XO agrees and adds that whether an IP-based service is an "information service," and free from the regulatory framework of Title II, does not depend on the fact that IP technology is used, as AT&T argues, but depends upon the features and characteristics of the service.

Considerations of market power should principally drive the formation of the appropriate regulatory regime. The clear market advantages that ILECs have today over their competitors due to their unparalleled facilities-based reach to end user locations will not automatically dissipate as today's PSTN evolves toward an all-IP PCN. In the Commission's forbearance proceedings addressing Verizon's and CenturyLink's (Qwest's) unbundling obligations and the Department of Justice's review of AT&T mergers, the government demonstrated concern with the persistence of ILEC market power, especially in business/enterprise markets, due to their control of last-mile facilities. The change in communication protocol will not remove the ILECs' market power. Accordingly, as the evolution to all-IP networks proceeds, the Commission should continue to apply both its unbundling and interconnection rules, modernizing them as appropriate, to ILECs to ensure that competitors have access to end user locations, both to provide retail service and to connect calls for their subscribers to customers of other providers, on reasonable and nondiscriminatory rates, terms, and conditions. The method by which ILECs can seek relief from these obligations in specific geographic markets should and

as market conditions change – namely, forbearance under Section 10 of the Act – is well-established and need not be reinveneted.

Finally, AT&T's call for experiments – "geographically limited trial runs" – in select wire centers to test its theories should be rejected. These trial runs are not necessary to ascertain the role the Commission should play in an all-IP PCN environment. Again, these issues can be raised by individual ILECs in specific locations should they believe market conditions have changed through forbearance petitions. AT&T's proposal has many other flaws: the brevity of the experiment would be insufficient to yield any meaningful results in light of how the industry works; the experiments, rather than reflecting reality, are likely to cause the ILECs temporarily to be on their best behavior with the hopes of obtaining long-term, widespread rewards; the trial runs would likely disrupt customers and potentially impose tremendous costs on competitors; and the experimental plan would run roughshod over the rights of states, all in the name of conducting an "experiment." There would be no mechanism to undo the harms that would occur when AT&T's experiments prove unsuccessful or resources to put restore the markets to their former status. Even ignoring the foregoing flaws, AT&T's concept does not include a control group or have provision for alternative regulatory structures for comparison purposes, offering no real basis for helpful analysis of what regulatory obligations should be preserved and where deregulation might be appropriate. Instead, AT&T's experiments would become nothing more than a back-door justification for removing its and other ILECs' regulatory obligations ahead of time in select markets in the hope that they can preserve their resulting gains in those markets after the fact.

Therefore, the Commission should deny the AT&T and NTCA Petitions and decline to initiate the comprehensive proceedings envisioned in their submissions. Instead, the

Commission should resolve its pending proceedings regarding competition policy and focus on establishing a framework to ensure that, as today's networks evolve toward an all-IP PCN, managed IP interconnection arrangements and access to last-mile facilities are available on reasonable and nondiscriminatory rates, terms, and conditions to carriers, such as XO, that have invested heavily in efficient IP technologies.

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COMMENTS OF XO COMMUNICATIONS, LLC
ON PETITIONS OF AT&T AND
NATIONAL TELECOMMUNICATIONS COOPERATIVE ASSOCIATION

XO Communications, LLC ("XO"), by its attorneys, hereby files its initial comments in the above-referenced docket. In the Public Notice initiating this docket, the Commission seeks comment on two petitions filed by AT&T, Inc., and the National Telecommunications Cooperative Association ("NTCA"), respectively, that (in the Commission's words) ask the Commission to open proceedings to "alter policies to respond to the ongoing technological transition of voice networks."[1] As discussed below, XO opposes the initiation of the proceedings envisioned by either of the two Petitioners and instead urges the Commission to proceed with already open proceedings to encourage and address the evolution to an all-IP public network. Most especially, AT&T's call for experimental trials to test its theories is antithetical to statutory

[1] Public Notice, GN Docket No. 12-353, DA 12-1999, released December 14, 2012 ("Public Notice"); AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, at 1 (filed Nov. 7, 2012) ("AT&T Petition"); Petition of the National Telecommunications Cooperative Association for a Rulemaking to Promote and Sustain the Ongoing TDM-to-IP Evolution, at 1 (filed Nov. 19, 2012) ("NTCA Petition").

requirements and Commission policies and regulations, are insufficiently rigorous, and will not produce relevant and necessary data. The Commission should firmly reject it.

I. INTRODUCTION

XO recognizes the tremendous value that industry-wide adoption of all-IP networks presents and is pleased to know that the FCC supports the robust evolution of networks in that direction. XO has learned firsthand that IP innovations create real network efficiencies, enable the development of new services, and provide great value for its customers.

Throughout its existence, XO has been an industry innovator, a role it has continued to play as it invests to progress toward an all-IP network. For instance, in 2006, XO pioneered the deployment of high-capacity services over existing copper facilities with the launch of Ethernet over Copper ("EoC"). EoC could initially provide speeds at up to 10 Mbps, then 45 Mbps, and last year XO accelerated its EoC connections to speeds of 100 Mbps. In 2006, XO completed its nationwide 10 Gbps network build, which increased to 40 Gbps in 2010 and last year achieved 100 Gbps speeds, coast-to-coast, for which XO earned Light Reading's "Best New Service" award in the Telecom category. XO's innovations have advanced IP-based services as well. In 2007, it introduced XO network-based IP-VPN solutions using Multi-Protocol Label Switching ("MPLS"), offering businesses a secure, intelligent and managed network to connect multiple offices over a single IP network infrastructure. XO's product "XO Anywhere" allows companies to have their employees turn any phone into an XO IP Flex office phone, an ideal solution for companies with mobile and distributed workforces. (XO Anywhere earned XO the 2008 Telephony Innovation Award.) In 2009, the company rolled out XO Enterprise SIP ("Session Initiation Protocol"), giving business and enterprise customers the flexibility and scalability to transform their distributed voice network architecture into a more centralized and cost-effective

VoIP solution. (XO Enterprise SIP earned XO the INTERNET TELEPHONY magazine 2009 Product of the Year Award.) In the last year, two of XO's products, "XO Hosted PBX" and "Concentric Cloud Contact Center Service," have won INTERNET TELEPHONY Product of the Year Awards.[2] In addition to these milestones, XO's Chief Technology Officer, Randy Nicklas, has served on the Commission's Technology Advisory Committee, which has been in the forefront of addressing the evolution to an all-IP public network.

As explained herein, XO submits that the Commission can and should address the evolution of the circuit-switched public switched telephone network ("PSTN") toward a packet-switched, IP-based public communications network ("PCN"), using the framework established by the Communications Act of 1934 (the "Act"), as amended by the Telecommunications Act of 1996 (the "1996 Act") and its own regulatory tools to promote continued competition. The evolution to an all-IP PCN is a metamorphosis that is already well underway in XO's network and in the industry at large. Rather than asking (and answering) the question AT&T poses – when is a good time to stop regulating the networks of AT&T and other incumbent local exchange carriers ("ILECs") as their networks become increasingly IP-based – the Commission should focus on enforcing its existing pro-competition rules and policies within the technology-neutral framework established by Congress in the 1996 Act and modernizing those rules and policies when necessary under that same pro-competitive rubric. This framework and the Commission's rules implementing it have supported the introduction of vigorous and innovative competitors like XO and served the interests of consumers for well over a decade. In addition to making substantial investments in metro fiber networks and a national backbone network, XO's

[2] All information regarding XO innovations described herein can be found on XO's website in the press archive section: http://www.xo.com/about/pressroom/Pages/press-releases-view-all.aspx.

rise to prominence as a competitor, for example, has been fueled by access to ILEC unbundled network elements ("UNEs") and interconnection, as provided for by Congress under the 1996 Act. As IP-based communications achieve prominence and ubiquity, the Commission should ensure that competitors remain able to meet consumer needs by obtaining essential ILEC last-mile facilities and interconnection on reasonable and nondiscriminatory rates, terms, and conditions. Existing procedures and proceedings are already in place by which the Commission can address those matters and update its regulations in parallel with carriers upgrading their networks. In short, the Commission should not initiate the comprehensive proceedings envisioned by AT&T or NTCA but should proceed to address the appropriate policies tailored to the emerging all-IP PCN through various dockets that it has already opened.

II. THE EVOLUTION OF THE PUBLIC COMMUNICATIONS NETWORK

A. Although the Public Communications Network Is Changing, Concerns about Market Power, Remain the Same

The original PCN was the PSTN, which is still an essential component of this nation's telecommunications infrastructure, although it is undergoing a significant technological transformation as carriers evolve to all IP-based platforms. As explained in the attached Declaration of Mr. Nicklas, the PSTN itself has a long history of incorporating new technologies and facilities to improve services and make network operations more efficient.[3] Switches, once they were introduced, have evolved from human form to mechanized automatic branch exchanges to digital switches to today's increasingly employed soft switches.[4] The evolution from the circuit-switched-based PSTN to the next generation packet-switched all-IP PCN is not

[3] *See* Attachment A, Declaration of Randy Nicklas, ¶¶ 10-14 ("Nicklas Declaration").

[4] *See id.*, ¶ 10.

qualitatively different. Consequently, it is misleading to suggest that the PSTN or the public network is becoming obsolete or "sunsetting." It is not. As Mr. Nicklas notes, "whether it is called the PSTN, the PCN, or by some other name, there will be a nationwide interconnected network distinct from the Internet for the indefinite future upon which carriers will exchange traffic and that allows the completion of quality voice calls and other interactive communications from one end user to another."[5] Accordingly, it is more accurate to say the PCN is evolving to become more ubiquitous and capable.

As this transformation of the PCN takes place, carriers with market power will preserve that power as best they are able. The change in format technology and the new services that those technologies permit will not, in and of themselves, undermine market advantages that providers have at present, particularly as those advantages principally reside in the facilities customers use to access the PCN. This type of market advantage manifests itself in two significant ways. First, without physical access to these customers, other carriers simply cannot compete sufficiently for the business. Second, when one carrier controls physical access to a significant number of customers, from a market power perspective, even if it offers to provide access to other carriers on a wholesale basis, efficient and cost-effective interconnection between that carrier and other providers is equally critical to the other providers if they are to offer a robust alternative service.[6]

Enforcing the obligations of ILECs during the transformation toward an all-IP PCN – and even afterward – will ensure carriers are able to obtain key ILEC last-mile inputs and interconnection at reasonable and nondiscriminatory rates, and on reasonable and

[5] *Id*. ¶ 26.

[6] *See id.*, ¶¶ 7, 18, 24-25.

nondiscriminatory terms and conditions. This is particularly true in the business/enterprise markets. While it may be the case that cable companies and commercial mobile radio service ("CMRS") providers offer alternatives to ILEC access for mass market services in an increasing number of geographic markets, it remains the case that ILECs retain their market power advantages in business/enterprise markets generally due to lack of alternative customer access facilities for these types of users in most cases. The network elements over which IP-based services are transmitted are not independent of the PCN, and access to ILEC UNEs, collocation, and interconnection will be essential during and after any technology transition because of the persistent market power of the ILECs.

Although this need is not one-dimensional, it is particularly acute in the case of managed IP interconnection for the exchange of managed IP voice services traffic. The Commission should stand ready – and make clear to industry participants that it is standing ready – to resolve specific market failures in this area. The Commission should be particularly mindful when ILECs adopt policies that shift costs to carriers that are progressing toward all-IP networks, mindful of the primary advantage that large ILECs will have as the PCN evolves to all-IP because of their market power.

B. XO's Evolving Network Today Is and Will Remain Interdependent with Other Networks and Subject to the Availability of Wholesale Inputs

XO's network today consists of a mix of facilities that it and its predecessors have installed, expanded, and updated since the mid-1990s in large and mid-size metropolitan markets across the country and of wholesale inputs that it has obtained from other ILEC and non-ILEC competitors.[7] In addition, XO's metropolitan network facilities are connected by a nationwide

[7] *See, e.g., id.*, ¶¶ 7, 21.

fiber backhaul facilities – again consisting of both XO-installed fiber and wholesale fiber obtained from other providers through UNEs, fiber leases, indefeasible rights of use ("IRUs"), and special access service. XO has been transforming its original circuit-switched-based network into a managed IP-based network for more than ten years.[8] It has done this through the installation of routers, soft switches, and session border controllers throughout its footprint to augment and, over time, replace its former series of circuit switches.[9] XO is decidedly in the middle of the evolution toward a predominantly packet-based IP network, but it has every expectation that its network will become completely IP-based.

XO's managed IP network is and will remain distinctly its own, but at the same time must be interconnected with the managed networks of other carriers for XO to continue to provide a variety of quality innovative interactive services, including managed IP voice. This interconnected series of managed carrier networks will constitute the next generation PCN, allowing customers that receive a series of similar services from a variety of providers to communicate with each other. Significantly, the managed IP-based networks that make up the PCN will not all be identical. XO's original fiber-ring based networks were markedly different than the copper-based, hub and spoke networks of its ILEC competitors in the years immediately following the 1996 Act. Nonetheless, using the provisions Congress provided for local competition in the 1996 Act, including access to UNEs, interconnection, and collocation (to access the network elements and for purposes of interconnection), XO was able to interconnect and intercommunicate with these different networks to provide its host of innovative and successful service offerings. There can be little doubt that the framework established by

[8] *See id.*, ¶¶ 18-19.

[9] *See id.*

Congress, by promoting competition through a variety of platforms,[10] has advanced the interests of consumers and the development of a more robust national communications infrastructure. The networks of competitors will continue to differ one from the other as a laboratory of different approaches – to the ultimate benefit of all consumers – but their successful interconnection on reasonable and nondiscriminatory rates, terms and conditions will remain essential for competition and innovative service offerings to thrive.

The similarity of the communications protocols used, even though the technologies and network architectures typically have been different, and bilateral agreements as to additional parameters to ensure quality of service has ensured a successful interconnecting of the networks. The same will be true of IP-based networks during and after the evolution to an all-IP PCN. As carrier networks progress to adopting all-IP architectures, facilities, and equipment in the coming years – just as they have for most of the last decade – they will contain a mix of IP-based technologies and equipment as well as TDM or other legacy equipment. That is inevitable and not surprising. It has, as explained in Mr. Nicklas's Declaration, essentially always been the case with the PSTN that carrier networks have been evolving, containing an ever-changing mix of technologies and equipment types.[11] The result will be collections of different, constantly evolving networks unified by their ability to offer competing services to the public at large, using different technologies, hardware, and software, but characterized by managed interconnections and protocols that will enable the providers to offer ubiquitous service to connect all members of

[10] *See* 47 U.S.C. §§ 251(a)-(c).

[11] *See* Nicklas Declaration, ¶¶ 10-14. *See also* Attachment B, Declaration of Ramani Pandurangan, XO's Executive Director of Network Engineering, appended hereto, ¶¶ 15-17, 25 ("Pandurangan Declaration") (explaining how a successful managed IP interconnection does not depend upon the network architecture and routing of the two carriers but upon the bilateral agreement of parameters managing the traffic over the interconnection arrangement).

the public. In short, the PCN will consist of the network of networks used by the various competing and complementary providers to offer services that meet the needs of the public for voice communications that the PSTN historically has satisfied. [12]

C. AT&T's Petition Is Predicated upon a Mischaracterization about Evolving Industry Networks

AT&T's Petition is premised on the erroneous worldview that all of today's services – voice, data, video, Internet access, and a whole host of other telecommunications and non-telecommunications – will be provided on one set of converged data-centric IP-based networks. In short, AT&T contends that the heir to the PSTN and the Internet will be a single undifferentiated network far different from today's PSTN. AT&T asserts that the transition is not about "engraft[ing] different routing technology on the same standalone 'telephone' network, but to *eliminate* any such standalone telephone network in favor of a converged IP ecosystem."[13] Just as AT&T contends that today's PCN, in the form of the circuit-switched PSTN, will disappear, AT&T argues that the regulatory classifications of "ILEC," "CLEC" and other categories of provider will disappear as all become "competing broadband ISPs."[14] In short, according to AT&T, today's PCN represents a dead end on the evolutionary tree of communications networks, and the regulations that applied to it should become extinct as well.

As explained herein and in the Declarations of Mr. Nicklas and Mr. Pandurangan, the PCN that will be used for managed IP-based voice communications in the future will be distinct

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[12] *See* Nicklas Declaration ¶ 26. Given the evolving nature of networks, XO questions whether it is correct to suggest there will be an end result or that the term "transition" is even appropriate as the PCN continues to evolve, both because it will be highly arbitrary to determine when the transition from the TDM-based PSTN to an all-IP PCN is complete and because the all-IP PCN itself is likely to continue to evolve and introduce new technologies.

[13] *Ex parte* letter of Robert W. Quinn, Jr., AT&T, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25, at 2 (filed Jan. 14, 2013) ("AT&T January 14 Letter").

[14] *Id*.

from the Internet, even if it might share some of the underlying facilities also used to provide Internet services, particularly those that allow for subscriber access to the PCN and the Internet.[15] XO, for example, offers both managed IP voice services and Internet access through the same customer access facility, a service called IP Flex. Where a single access facility (via XO's own network or circuits leased from another provider on a wholesale basis) supports two such disparate services, an XO router segregates the Internet traffic from the managed IP voice traffic onto distinct network paths prior to handing off the traffic to other providers for termination.[16] While individual physical network elements may accommodate the transmission of multiple services, these services individually, nonetheless may be classified as telecommunications services or information services and thus may be subject to the differing legal and regulatory requirements under the Act.

Mr. Pandurangan explains in the attached Declaration that the routing requirements, including the features and functionalities utilized to manage traffic and implement successful interconnection, are markedly different in the two interconnection scenarios, presented by Internet traffic and managed IP voice communications, especially those provided to businesses

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[15] *See* Section IV, *infra; see also, e.g.*, Nicklas Declaration at ¶¶ 4-5, 8-9, 15-16; Pandurangan Declaration at ¶¶ 9-10, 30. The Commission has long recognized, if not encouraged, that individual customer access facilities could be used for multiple service connections, including a mix of both telecommunications and information services (including Internet access) and that this characteristic did not present an obstacle to regulating competitive access to such facilities. *See, e.g., Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, et al.*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978, ¶¶ 147-148 (2003) (rejecting arguments that the 1996 Act forbids the use of UNEs for information services and telecommunications services simultaneously), *vacated in part on other grounds and remanded sub nom USTA v. FCC*, 359 F.3d 554 (D.C. Cir. 2004).

[16] *See* Pandurangan Declaration, ¶¶ 24-25. Much of the discussion in these comments involving managed IP voice communications applies to other managed services with real-time and QoS demands, such as managed IP video calling. For the sake of simplicity, the comments will not continuously refer to these other types of managed services expressly.

and enterprise customers. The routing of Internet traffic via Internet peering arrangements requires only routers to forward the packets that make up the traffic to their final destination, which is accomplished on a "best efforts" basis. This means that the packets are not handled in a manner seeking to satisfy particular Quality of Service ("QoS") metrics (bandwidth contention, jitter, packet loss, latency, among others).[17]

While this "best efforts" Internet peering arrangement is appropriate for routing public Internet traffic, it provides insufficient quality of service for managed IP voice services sought by business and enterprise customers.[18] Rather than simply relying on the best efforts of the routers in Internet peering arrangements, interconnection for routing of managed IP voice traffic – managed IP interconnection – requires agreement among providers on a variety of parameters to ensure QoS demands are satisfied.[19] These parameters are inserted into the voice packets by session border controllers ("SBCs"), equipment whose features and functionalities are essential for successful interconnection and QoS for managed IP voice traffic, but whose functionalities are totally irrelevant to the exchange of public Internet traffic.[20]

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[17] *See* Pandurangan Declaration ¶¶ 4, 16-22.

[18] AT&T has pointed to the "success" of over-the-top VoIP applications such as Vonage and Skype. These services may be "well received" by customers for whom quality of service is secondary, *i.e.*, residential customers on a budget. For a lower price, these customers are willing to accept voice service that has minimal or no QoS. In the case of business and enterprise customers, in contrast, there are QoS metrics that cannot be met by routing of voice traffic over the Internet. *See* Nicklas Declaration, ¶¶ 14, 23; Pandurangan Declaration, ¶¶ 4, 9, 18. Accordingly, this is another example where the Commission must differentiate between mass-market services and business or enterprise customers, as it has, for example, in its market-based forbearance proceedings time and time again. *See* discussion below in Section V.

[19] *See* Pandurangan Declaration ¶ 17.

[20] *See* Pandurangan Declaration ¶ 26. As explained by Mr. Nicklas, while the IP-based PCN of the future may incorporate the features and functionalities of today's managed networks in a different manner, those features and functionalities are indispensable and will ensure that the path of managed IP voice traffic over the PCN remains distinct from the path of Internet traffic. *See* Nicklas Declaration, ¶ 23.

NTCA offers a more balanced view of industry changes, from XO's perspective, acknowledging that the Internet is not going to swallow up today's PSTN or the next generation IP-based PCN.[21] NTCA recognizes that there is an evolution of the current PCN, "a technology shift within a network (or, really a series of interconnected networks)."[22] NTCA further states that, despite the shift to a new network platform, the core objectives of the Act in general, and the 1996 Act, in particular, "must apply with equal force whether services are rendered through Class 5 TDM switches and copper networks or routers, soft switches, and cutting-edge fiber or wireless solutions."[23] NTCA notes that regulatory distinctions do not turn on changes in technology.

In fact, the Commission has consistently maintained technological neutrality in its regulatory framework, following the lead of Congress which wisely avoided making specific technologies the focus of Sections 201, 202, 251, 252, and 253 of the Act.[24] Sections 251(a) and 251(c)(2) do not limit interconnection obligations to certain types of telecommunications service technologies. In its *Advanced Services* proceeding over ten years ago, the Commission observed

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[21] XO believes that while it may be the case that certain Commission regulations may need to be reviewed to ensure they support competition as technologies and network architectures change, it does not believe it is necessary to open a new comprehensive review of all regulations as NTCA proposes. This would prove a burdensome and unwarranted exercise. As explained below, the regulatory framework to address the necessary regulations as the PCN evolves is already in place. *See* Section III.B.

[22] NTCA Petition at 2 (emphasis in original). NTCA refers to this evolving network as the "Public Routed Communications Network," whereas XO refers to it herein as the Public Communications Network, or PCN. The two terms would appear to be largely identical.

[23] *Id*. at 4.

[24] *See* 47 USC §§ 201, 202, 251, 252, and 253. The statute's key definitions for purposes of the competition provisions of sections 251 and 252 are agnostic as to specific technologies. *See* 47 USC §§ 153(16)("exchange access'), (24)("information services"), (43)("telecommunications"), (44)("telecommunications carrier), (45)("telecommunications equipment"), (46)("telecommunications service"), (47)("telephone exchange service"), (48)("telephone toll service"), and (49)("exchange access").

that "Congress made clear that the 1996 Act is technologically neutral and is designed to ensure competition in all telecommunications markets…."[25] In its Further Notice of Proposed Rulemaking in its *USF/ICC Transformation* proceeding, the Commission noted that interconnection requirements under the Act do not depend upon the network technology underlying the interconnection.[26] Under Section 251(c)(3), unless the Commission finds that a provider is no longer classified as an ILEC, the Commission must implement and enforce the carrier's unbundling obligations per Section 251(d)(2) or, as discussed later, forbear from imposing those obligations after a proper market analysis. The technology used is not a factor identified by the 1996 Act to be applied in this analysis. Similarly, the right of requesting carriers to collocate on the premises of ILECs to access UNEs and interconnection does not depend on the technology used. Accordingly, there can be little doubt that these provisions apply to telecommunications carriers and their networks regardless of the technologies they use to provide their services. Where the statute comes close to discussing specific technologies, for example in the definition of "telephone exchange service," an alternate, broad definition is offered that discusses "*comparable* service provided through *a system of . . . facilities* by which a subscriber can originate and terminate a telecommunications service."[27]

In short, the public Internet and an all-IP PCN should not be conflated because the technology or communications protocol used in a network does not define the appropriate

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[25] *Deployment of Wireline Services Offering Advanced Telecommunications Capability, Order on Remand*, 15 FCC Rd 385, ¶ 2 (1999) ("Advanced Services Order"), *remanded on other grounds WorldCom, Inc. v. FCC*, 246 F.3d 690 (D.C. Cir. 2001).

[26] *See USF/ICC Transformation Order and FNPRM*, ¶ 1011.

[27] 47 U.S.C. §§ 153(47)(B)(emphasis added). Both terms, "exchange access" and "telephone toll service" are defined by reference and contrast with telephone exchange services and therefore those definitions must be interpreted through reference to the definition of "telephone exchange services," including this alternate definition.

regulatory framework. The managed IP services supported by the all-IP PCN, such as managed IP voice, run on network paths independent from public Internet traffic.[28] Moreover, IP is just a technology and is not a driver for the regulatory classifications and burdens set forth in the pro-competition provisions of Title II of the Act. Therefore, AT&T's effort to eliminate all regulation in connection with its current and future IP networks simply because of the use of a similar communications protocol should be rejected by the Commission as meritless.

III. THE COMMISSION NEED NOT INITIATE A NEW COMPREHENSIVE RULEMAKING TO STIMULATE A TRANSITION TO AN ALL-IP PCN

XO's experience as an innovator in its conversion to an all-IP network is not unique, especially among CLECs. Even ILECs, without receiving special deregulatory relief, have installed and continue to upgrade their networks with IP technology and are providing IP-based services.[29] XO and other major carriers understand that all-IP networks are more efficient and enable the provision of higher quality and performance services. However, the pace at which the conversion has taken place should not be dictated by the plans and strategic objectives of AT&T or even a group of ILECs or through regulatory fiat, for example by setting a sunset date when wireline networks connected to the PCN must abandon technologies within the respective carrier's networks. There are sufficient incentives in place to propel carriers toward adoption of

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[28] As Charter Communications explained in a recent *ex parte*, rebutting ILECs claims "that IP interconnection [for managed voice traffic] is essentially the same as Internet peering," "managed VoIP networks . . . do not traverse the public Internet" and have "quality of service guarantees [that] require additional arrangements between interconnecting VoIP providers" that are unnecessary for "Internet data traffic." Letter of Samuel L. Feder, Jenner & Block, Attorney for Charter Communications, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 *et al.*, at 2 (filed Dec. 17, 2012).

[29] *See* Competitive Local Exchange Carriers (CLECs): A US Market Report (abstract), http://www.companiesandmarkets.com/Market/Telecommunications/Market-Research/Competitive-Local-Exchange-Carriers-CLECs-A-US-Market-Report/RPT1102255?aCode=e7702a5b-ad88-47dd-bb7a-a58072d4bda2

all-IP platforms, as demonstrated by the comments in response to the Further Notice of Proposed Rulemaking accompanying the *USF/ICC Transformation Order*. Accordingly, while XO advocates adoption of a requirement for ubiquitous managed IP interconnection between carriers, each carrier should individually determine when and how quickly it incorporates IP technology further into its networks to meet customer needs.

Significantly, as competitive telecommunications carriers upgrade their networks with IP technology, they should be able to invoke the rights created by Congress under the 1996 Act – and enforcement of obligations imposed on ILECs and other telecommunications carriers – to the extent ILECs continue to manifest sufficient market power. Only if the Commission determines in specific geographic and product markets that ILECs no longer maintain sufficient market power to necessitate enforcement of the 1996 Act's directives, or its regulations implementing the 1996 Act, may those obligations be lifted. Congress established this forbearance framework with Section 10 of the Act,[30] which the Commission has implemented in addressing numerous forbearance requests over the past decade. As a result of these proceedings, for example, it is now well established that individual wire centers represent the appropriate geographic markets for lifting loop unbundling obligations and that the mass market and enterprise markets represent distinct product markets.[31] Somewhat surprisingly, AT&T's Petition gives the Commission's forbearance analysis framework nary a glance in promoting an all-IP environment in which it no longer has unbundling obligations. Instead, AT&T seeks to

[30] *See* 47 U.S.C. § 160.

[31] *See, e.g., Petitions of Qwest Corporation for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Phoenix, Arizona Metropolitan Statistical Area*, Memorandum Opinion and Order, 25 FCC Rcd 8622 (2010) ("Phoenix Forbearance Order") *aff'd sub nom Qwest Corporation v. FCC,* 689 F.3d 1214 (10th Cir. 2012); *Petitions of the Verizon Telephone Companies for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Boston, New York, Philadelphia, Pittsburgh, Providence and Virginia Beach Metropolitan Statistical Areas*, Memorandum Opinion and Order, 22 FCC Rcd 21293 (2007) ("Verizon Forbearance Petition Order").

have all IP-based services treated as information services and relieve itself of state and federal regulatory requirements to the extent it provides such services.[32]

As explained above in Section II.C, the rights and obligations under the Act, in general, and the 1996 Act, in particular, are technology-neutral. AT&T, in its Petition, ignores the technological neutrality of the Act,[33] contending that the Commission would no longer need to enforce most, if not all, ILEC obligations in an all-IP industry.[34] This argument relies on a mischaracterization of the framework of the Act. AT&T asks the FCC, without foundation or justification, to find that all services using IP technology are necessarily information services, and therefore outside the Title II regulatory framework. More broadly, AT&T seeks to avoid the application of the definitions in the Act when requesting this blanket service categorization because its goal is to abdicate all obligations it has under the Act that would apply to IP-based services. The Commission should decline the invitation to act in so arbitrary and capricious a manner. As explained below, the Commission takes a more probing view of IP-based services before categorizing them, which also underscores why the Commission need not initiate the new comprehensive proceedings that AT&T (and NTCA) seek.

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[32] *See* AT&T Petition at 18.

[33] XO recognizes that in certain limited circumstances the Commission in the past has issued orders or adopted regulations which could be perceived as not being technologically neutral. Those determinations were made in a different environment before the inevitability of a complete evolution to an all-IP world was as clear as it is today. The Commission and Transition Task Force should take up the issue of whether any of these few decisions that are facially not technologically-neutral should be reconsidered in light of the present and developing circumstances to ensure a pro-competitive outcome. As the Commission recognized in its *Phoenix Forbearance Order*, discussed later in these Comments, subsequent competition developments can justify reevaluating the wisdom of earlier approaches. *See Phoenix Forbearance Order*, ¶¶ 33-36.

[34] *See* AT&T Petition at 12-20.

A. Commission Precedent Does Not Support a Finding That All IP-Based Services Are Information Services

While the Commission has found that some IP-based services are information services, the agency has never endorsed the broad brush approach AT&T advocates to place all services using IP technology into that regulatory classification. Instead, the Commission has examined services on a case-by-case basis, going well beyond considering their use of IP or another technology as a touchstone for determining proper regulatory treatment. This is the correct approach because the use of IP technology, in itself, does not ensure that a service will satisfy the Act's definition of "information services,"[35] as the Commission's cases over the last decade demonstrate.[36]

In 2004, the FCC found that a free, computer-to-computer communications service traveling solely over the Internet and not connected to the public at large, i.e., not connected to the PSTN, was not a telecommunications service.[37] Unlike the communications service offered by pulver.com in that case, the managed IP voice services offered by providers today are typically not free and connect users to the PSTN. In the same year as the *pulver.com* decision, the Commission determined that AT&T's own IP-in-the-middle service was a

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[35] 47 U.S.C. §153(24): "The term 'information service' means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service."

[36] In addition, before the advent of IP-based services, the Commission had found that a packet switched service can be basic telecommunications service. *See In re Independent Data Communications Manufacturers Association, Inc., Petition for Declaratory Ruling That AT&T's InterSpan Frame Relay Service Is a Basic Service*, 10 FCC Rcd 13717, ¶¶ 4 & 11 (1995) (concluding that frame relay and X.25 services are basic services).

[37] *See Petition for Declaratory Ruling that pulver.com's Free World Dialup is Neither Telecommunications Nor a Telecommunications Service*, Memorandum Opinion and Order, 19 FCC Rcd 3307 (2004).

telecommunications service, despite the use of IP technology.[38] Central to the Commission's decision in that case was that the service did not undergo a net protocol conversion.[39] A service that both originates and terminates in IP, which would presumably be the case within an industry of all-IP networks, also does not undergo a net protocol conversion. To the extent the service is telecommunications and offered to the public for a fee and connected to the PCN, thereby allowing subscribers to communicate with any other subscriber connected to the PCN, without "generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications," that service would at least arguably be a telecommunications service. Yet these are the services that AT&T would have the Commission determine, without a close examination, are information services simply because they are IP-based.[40]

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[38] *In re Petition for Declaratory Ruling That AT&T's Phone-to-Phone IP Telephony Services Are Exempt from Access Charges*, Order, 19 FCC Red 7457 (2004)

[39] *Id*. at 7457, 7459, 7465. Indeed, it is an open question whether, consistent with Commission precedent, a net protocol conversion in and of itself is sufficient for a service to be considered an information service in all cases. *Id*. at 7459, n.13. In 2006, the Commission found that providers of two-way VoIP services accessed over broadband and interconnected with the PSTN are "providers of telecommunications," as defined by the Act. *Universal Service Contribution Methodology*, Report and Order and Notice of Proposed Rulemaking, 21 FCC Rcd 7518, 7538-43 (2006), *aff'd in relevant part, Vonage Holdings Corp., v. FCC*, 489 F.3d 1232 (D.C. Cir. 2007). The Commission did not, in that decision, reach the issue whether interconnected VoIP was an information service or a telecommunications service. *Id*. at 7537, ¶ 20. Stated differently, the Commission did not reach the issue of whether providers of interconnected VoIP "offer" telecommunications for a fee to the public, *i.e.*, whether interconnected VoIP satisfies the definition of "telecommunications service." *See* 47 U.S.C. § 153(53) ("'telecommunications service' means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.").

[40] The Commission has also stated that telecommunications carriers carrying wholesale IP-based services act as telecommunications carriers when they carry such traffic. *See Time Warner Cable Request for Declaratory Ruling that Competitive Local Exchange Carriers May Obtain Interconnection Under Section 251 of the Communications Act of 1934, as Amended, to Provide Wholesale Telecommunications Services to VoIP Providers*, Memorandum Opinion and Order, 22 FCC Rcd 3513, ¶ 1 (2007) ("TWC Order"). This decision was based on a case-specific analysis of the services and interconnection arrangement that was the subject of the dispute,

(footnote continued)

Not only is it the case that the Commission has declined to treat all IP-based services categorically as information services, tellingly, it has recognized that services accessed through TDM, or circuit-switched based calling may be information services, underscoring that each service must be examined on its own merits. For example, voice mail, interactive voice response, and dial-up Internet access have always been treated as enhanced, just as earlier dial-up gateways to online databases, such as the original NEXIS and LEXIS services, were considered enhanced, or information, services.[41]

The foregoing discussion demonstrates that the technology used to provide a service is an inadequate basis for determining its classification. IP is a technology, not a service. Individual IP-based services – and the appropriate regulatory regimes, if any – must be evaluated pursuant to the statutory and regulatory definitions. More broadly, the Commission should simply decline to categorize all IP-based services as information services. Instead, until and if Congress decides to modify the Act in a fundamental manner, the Commission must continue to classify services based on the nature and capabilities of the services and application of the statutory criteria, guided by previous decisions the Commission has made under the statute's framework.

(footnote continued from previous page)
putting further to the lie the notion that a service is an information service where the traffic is IP-based.

[41] In 1998, the Commission noted that "[e]xamples of services [it] has treated as enhanced include voice mail, electronic mail, facsimile store-and-forward, interactive voice response, protocol processing, gateway, and audiotext information services" as well as "electronic store-and-forward, data processing, gateways to online databases, and alarm monitoring." *Matter of Implementation of Section 255 of the Telecommunications Act of 1996,* WT Docket No. 96-198, Notice of Proposed Rulemaking, FCC 98-55, ¶ 38 (Apr. 30, 1998) (footnotes omitted).

B. The Commission Should Pursue the Proceedings Concerning IP-Based Services It Has Already Initiated Rather Than Commence a Comprehensive Action

A new proceeding of the comprehensive sort that AT&T or NTCA proposes is not necessary to promote the evolution to an all-IP PCN. The Commission already has underway adequate proceedings to consider the principal issues presented by the AT&T and NTCA Petitions: (1) to determine the regulatory status of IP-enabled services,[42] (2) to consider the regulatory protections needed to ensure managed IP interconnection takes place in a competitively-balanced environment and to ascertain the extent to which ILECs' carrier of last resort obligations should apply,[43] (3) to examine procedures and protections associated with copper loop retirement,[44] and (4) to consider whether the conditions have been met to forbear from certain other dominant carrier obligations, including equal access rules in an packet-switched service environment.[45] As for any subject matters raised in AT&T's petition that may not be covered by these open proceedings, the existing regulatory framework provides vehicles to address them: AT&T may seek elimination or a lightening of its current federal or state obligations via a petition for forbearance or preemption, as appropriate.

Complementing these open proceedings, last month the Commission created the Technology Transitions Policy Task Force to address the matters surrounding the technological evolution and how to ensure competition and consumer protections are preserved for future

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[42] *See IP-Enabled Services*, Notice of Proposed Rulemaking, 19 FCC Rcd 4863 (2004).

[43] *See Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663 (2011).

[44] *See Pleading Cycle Established for Comments on Petitions for Rulemaking and Clarification Regarding the Commission's Rules Applicable to Retirement of Copper Loops and Copper Subloops*, RM-11358, Public Notice, DA 07-209 (2007).

[45] *See Petition of USTelecom for Forbearance from Enforcement of Certain Legacy Telecommunications Regulations*, WC Docket No. 12-61 (filed Feb. 16, 2012).

generations.[46] XO appreciates that this Task Force highlights the Commission's commitment of resources to examine the issues raised by the evolution of networks from TDM technology to IP and other next generation technologies. XO intends to assist the Task Force in updating the Commission's competition policies where appropriate and providing a framework for action in the individual proceedings already underway that address interconnection and related issues raised by the evolution to an all-IP PCN.

IV. THE COMMISSION SHOULD MAKE A PRIORITY OF ESTABLISHING DEFAULT INTERCONNECTION REQUIREMENTS FOR THE EXCHANGE OF MANAGED IP VOICE TRAFFIC OVER THE PCN[47]

Managed IP interconnection for voice services should not be confused with Internet peering, as mentioned above. These are two distinct types of interconnection whose only similarities are that they are a physical linking of networks and that the traffic exchanged over the interconnection facilities is in IP format. But as explained above in Section II.C., *supra*, Internet peering cannot simply be substituted for managed IP interconnection, as AT&T seems to suggest.

The need for managed IP interconnection arises as a result of innovative providers like XO evolving rapidly toward an all-IP managed network even as other carriers, including many ILECs, move more slowly. XO has actively pursued managed IP interconnection arrangements to exchange its customers' voice traffic for many years because of the efficiencies they create, and XO has advocated that the Commission adopt rigorous requirements mandating managed IP

[46] *See* FCC News Release, "FCC Chairman Julius Genachowski Announces Formation of 'Technology Transitions Policy Task Force" (Dec. 10. 2012).

interconnection.[48] Although the FCC has "encouraged" carriers to negotiate IP-IP interconnection "in good faith," it is not enough. In several cases, through private negotiations, XO has had modest success in establishing commercially negotiated managed IP interconnection with other providers.[49] In all cases, these arrangements are distinct from the Internet peering arrangements XO has had for years.[50]

However, the lack of ubiquitous managed IP interconnection arrangements imposes costs on XO that both discourages further migration to IP on XO's network by placing the responsibility of TDM-IP conversion on XO[51] and serves to inhibit progress toward IP on the part of the other carriers. In addition to the costs of conversion, XO must assume burdensome, costly and unnecessary overhead in engineering design, network planning, mediation and billing, and maintain duplicative interconnected circuits with either the ILEC end office switch and/or tandem switch.[52] Furthermore, IP-based points of interconnection ("POIs") can, generally speaking, serve a larger geographic area than current TDM POIs, an additional way in which managed IP interconnection reduces the costs of interconnection. Appropriate incentives do not exist today to encourage ILECs generally to negotiate and establish widespread managed IP interconnection with other carriers on reasonable and nondiscriminatory terms.

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[48] *See, e.g.,* Comments of XO, WC Docket No. 10-90 *et al.,* (filed Feb. 24, 2012) ("XO IP Interconnection Comments"); Reply Comments of XO (filed Mar. 30, 2012).

[49] *See* Pandurangan Declaration ¶ 13.

[50] *See id.*, ¶ 14.

[51] To the extent that XO has customers that originate traffic in TDM, which it will for the foreseeable future, albeit in diminishing numbers (*see* Pandurangan Declaration, ¶ 11), the costs of conversion before delivering the traffic over managed IP interconnection arrangements serves as incentive for XO to move those customers to managed IP-based services, especially as XO is able to negotiate an increasing number and more robust managed IP interconnection arrangements. Conversely, where XO does not succeed in entering into managed IP interconnection arrangements, XO will be required to bear the extra costs of converting its IP-based traffic to TDM before exchanging it with the other carrier. *Id*.

[52] *Id*. ¶ 8.

More importantly, AT&T's lack of willingness to enter into a managed IP interconnection arrangement with XO for interconnection with its ILEC network facilities puts to the lie several premises to the AT&T Petition. First, AT&T's claim that the industry is transitioning toward a single converged network of networks and all services will merely be over-the-top applications is revealed for what it is, a gross overstatement. If it were true, then AT&T should embrace XO's overtures for mutual exchange of voice traffic in managed IP format.[53] Instead, AT&T's resistance to allow XO access to its ILEC network via a managed IP interconnection arrangement makes clear that Internet peering is qualitatively different than managed IP interconnection and that AT&T's ILEC facilities likely to still have many TDM components by the company's own choosing. Commission intervention is necessary to ensure that XO is able to interconnect with AT&T's ILEC facilities and other incumbents on a managed IP basis. XO agrees with the Commission that it "should affirmatively encourage the transition to IP-to-IP interconnection where it increases overall efficiency for providers to interconnect in this manner."[54]

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[53] As XO explained in its initial comments on the *CAF/ICC Transformation FNPRM* on intercarrier compensation issues, the development of Internet peering arrangements does not provide a model for the manner in which managed IP interconnection can be expected to develop without regulation. *See* XO IP Interconnection Comments at 10-11. The Internet developed without the existence of a legacy alternate technology and compensation regime guaranteeing revenue streams to certain Internet backbone providers and also permitted those providers to impose unnecessary costs on their competitors. To provide services to their customers, Internet service providers and competitive backbone providers had no choice but to accede to market-based forces to interconnect on an IP-basis for the exchange of Internet traffic. In the context of interconnection for IP-voice traffic, the ongoing existence and ILECs' reliance on TDM interconnection facilities remains an obstacle to managed IP-based exchange of voice traffic. Although XO is aware of the ILECs' professed desire for market forces to determine efficient interconnection mechanisms for all networks carrying managed IP-based traffic, it is clear from XO's experience that the shift to managed IP interconnection on reasonable, competitive rates, terms, and conditions will not occur without regulatory oversight.

[54] *USF/ICC Transformation Order and FNPRM*, ¶ 1360.

XO is committed to implementing full managed IP interconnection arrangements despite its modest success to date. But due to the interconnected nature of telecommunications networks, to realize the true cost benefits of an all-IP network, managed IP interconnection must become readily available upon request. These benefits cannot be realized while XO, after it has committed itself to develop an all-IP network to carry its customers' managed IP voice traffic, must continue to maintain TDM interconnection and access circuits at numerous ILEC tandems or end offices throughout the country, rather than in a handful of locations as rational managed IP interconnection arrangements would permit.[55] XO urges the Commission to clarify that under the Act, ILECs must enter into negotiations for managed IP interconnection arrangements upon request, subject to State arbitration when the parties cannot reach agreement within the timeframes set forth in Section 251(c)(2).[56] The resulting regulatory certainty will provide an incentive for carriers to act rationally and accelerate deployment of an all-IP PCN.

At the same time, steps taken by the Commission to provide certainty regarding the availability of managed IP interconnection need not force carriers to convert their entire network to an all-IP framework if they are unable or unprepared to do so at present. The Commission should leave to individual carriers the pace at which they adopt IP technology into their networks and the choice whether and where to assume the burden of converting traffic to and from TDM format. If the Commission adopts a properly functioning managed IP interconnection regime, market forces and network efficiencies will ensure reasonably prompt adoption of IP technology within networks – meaning within the PCN – more broadly.

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[55] *See* Nicklas Declaration, ¶ 24; Pandurangan Declaration, ¶ 8.

[56] *See* XO IP Interconnection Comments at 18-19 for a more complete discussion of XO's proposals regarding Commission regulation of managed IP interconnection.

V. ACCESS TO UNES AND ENFORCEMENT OF OTHER ILEC OBLIGATIONS WILL STILL BE NECESSARY DURING AND AFTER THE EVOLUTION TO IP-BASED NETWORKS, AND AN ALL-IP PCN, SO LONG AS ILECS HAVE MARKET POWER OVER ESSENTIAL LOCAL ACCESS FACILITIES

During the evolution to an all-IP PCN, access to customer locations will be as important to providers as has been the case since the establishment of the PSTN. Without competitive access to the customer, robust competition cannot fully develop. Carriers that control sufficient numbers of last-mile connections, whether on a retail or wholesale basis, for which there are no competitive alternatives will be able to demand excessive (supracompetitive) value from other providers for access to those locations. Where alternative access facilities do not exist and their construction is unlikely, the provider owning or controlling connectivity possesses market power in a small geographic market, and regulatory controls are necessary to enable competitive providers to gain access to that customer at reasonable and nondiscriminatory rates terms and conditions.

Moreover, as explained in the Declaration of Mr. Nicklas, AT&T and other ILECs, as well as competing carriers, are likely to have pre-IP technology components in their networks for the foreseeable future because of the continuing value of these components to customers and providers.[57] For instance, a significant number of ILECs, including AT&T, will have copper loops facilities yet for many years, including connections to business and enterprise locations. However, even after AT&T and other ILECs convert their access facilities to fiber at business or enterprise locations, they are still likely to be the only carrier with facilities into significant

[57] *See* Nicklas Declaration ¶ 20.

portions of the commercial buildings and remain the only carrier likely to justify the deployment of those last-mile facilities.[58]

The lack of significant loop alternatives for competitive carriers trying to serve business and enterprise customers without relying on leased ILEC inputs – even in the largest markets where one would expect widespread alternative sources to develop first – has been well demonstrated in recent years. When the Commission denied Verizon forbearance from its unbundling obligations in its six largest geographic markets in the enterprise product market, it found that "the record does not reflect any significant alternative sources of wholesale inputs for carriers in the 6 MSAs."[59] The Commission also explained that it could not conclude that Verizon faced a sufficient level of facilities-based competition to warrant forbearance from its unbundling obligations because cable operators did not play a significant role in serving enterprise customers; Verizon's market shares were sufficiently higher than the aggregate of other cable operators'; and there was no record of other competitors in the six MSAs that had deployed their own extensive last-mile facilities for use in serving the enterprise market.[60]

Three years later, in the Qwest Phoenix Forbearance Order affirmed by the U.S. Court of Appeals several months ago, the Commission found a lack of significant last-mile facilities constructed by competitors, a lack of wholesale alternatives, and that competitive facilities-based entry was unlikely in the short run. Accordingly, the Commission declined to lift Qwest's unbundling obligations in both the mass market and enterprise markets.[61] Notably, no ILEC has

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[58] *See id.* ¶ 6.

[59] Verizon Forbearance Petition MO&O, ¶ 38.

[60] *Id.* ¶¶ 16, 22, 23.

[61] Phoenix Forbearance Order, 25 FCC Rcd 8622, 37-41, 43-50, 62.

sought an MSA-based grant of forbearance since the FCC's Qwest decision, suggesting that conditions have not changed in, not just Phoenix, but all other markets as well.[62]

AT&T too has been confronted by the government's consistent concern with ILEC market power. When it applied for approval of its merger with SBC Communications six years ago, the Department of Justice ("DOJ") completed an exhaustive analysis of the impact on access to office buildings in SBC territory. The impetus was the Department's concern that competition to the buildings did not exist – many of the buildings were served only by SBC, AT&T, or the two companies. The Department concluded that individual buildings constituted relevant geographic markets (not wire centers or metropolitan areas) for the access facilities in question. The DOJ was particularly concerned that competition, in terms of facilities-based access to the buildings by others, was unlikely to develop for the foreseeable future, due to the cost of installing alternative last-mile facilities with an insufficient chance of investment cost recovery. In adopting the consent decree between the merger applicants and the United States, Judge Sullivan noted the DOJ's extremely detailed building-by-building analysis to ascertain where facilities had to be divested to preserve some semblance of competition where the two merger applicants were the only two that served a building.[63]

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[62] In a recent Petition for Declaratory Ruling, the United States Telecom Association acknowledges that LECs that control access to their own end users "continue to have [market] power." *See* Petition of USTelecom for Declaratory Ruling that Incumbent Local Exchange Carriers Are Non-Dominant in the Provision of Switched Access Services, WC Docket No. 13-3, at 9 n. 16 (filed Dec. 19, 2012). Although USTelecom was speaking about power relative to interexchange carriers seeking to terminate calls to LECs with control of access to their own end users, its acknowledgment underscores a vital point, that any carrier that controls access to a significant number of customer locations for all purposes in a specific geographic market, whether interexchange carriers, competitive LECs, or otherwise, presumptively possesses market power.

[63] *See United States of America v. SBC Communications, Inc. and AT&T Corp.*, Opinion, Civil Action No. 05-2102 (EGS) and consolidated case, at 45-49 (D.D.C. Mar. 29, 2007).

The persistent value of the final mile into buildings – and the market power it gives the owners – was underscored several years ago by the Chairman of AT&T. When asked about the competitive impact of providers of over-the-top interconnected VoIP or other advanced services providers who did not have their own facilities, he responded, in effect, that AT&T maintained the ultimate bargaining chip because of its control of customer access facilities:

> [BusinessWeek] "How concerned are you about Internet upstarts like Google (), MSN, Vonage, and others?"
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> [Edward Whitacre] "How do you think they're going to get to customers? Through a broadband pipe. Cable companies have them. We have them. Now what they would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using. Why should they be allowed to use my pipes?
>
> "The Internet can't be free in that sense, because we and the cable companies have made an investment and for a Google or Yahoo! () or Vonage or anybody to expect to use these pipes [for] free is nuts!"[64]

As Mr. Whitacre made clear, AT&T made an investment in its customers' connections to the PCN and plans both to profit from that investment and defend it against encroachment by others who would use it. His remarks illustrate and underscore that, with an all-IP PCN, just as it is the case today, competitors that require access to an end user's facilities that connect him or her to the PSTN or PCN will remain beholden to the owner of those facilities. As Mr. Nicklas notes, for XO to be able to provide most customers across the markets where it operates with

[64] Businessweek.com, 'Online Extra: At SBC, It's All About "Scale and Scope,"' November 6, 2005, posted at http://www.businessweek.com/stories/2005-11-06/online-extra-at-sbc-its-all-about-scale-and-scope.

alternative, innovative services, it requires some wholesale input from the ILECs.[65] Where the facilities' owner controls enough facilities to a large enough set of end users, even if it is not serving all of them at the moment, it can assert market power in that market.[66]

For these reasons, during and after the evolution toward an all-IP PCN, AT&T and other ILECs will likely continue to have market power over access to end user customers, especially in the business and enterprise markets. This necessitates that ILECs continue to be required to make their customer access connection facilities available to competitors on a wholesale, unbundled basis – along with collocation rights to enable them to reasonably access those network elements – subject to an appropriate pro-competitive regulatory framework, whether it be UNEs or a replacement. Current law provides requesting carriers with rights to certain UNEs, and only under a demonstrated change in the market should this regime be altered. Avenues exist for this today as explained below. AT&T's Petition is not one of them. Competitors will also require access to reasonably-priced special access during and after this migration where UNEs are unavailable under the Commission's regulations. Without continued regulatory intervention, AT&T's proposal that competition be based solely on market-based agreements in an all-IP PCN will prove ineffective for robust competition and "attractive wholesale offerings."[67]

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[65] *See* Nicklas Declaration, ¶ 21.

[66] *See id.*, ¶ 6-7. In a recent *ex parte* filing in WC Docket No. 10-90 and other proceedings, AT&T attempts to denigrate the competition by carriers that rely heavily on wholesale inputs from ILECs, calling it "synthetic completion." AT&T January 14 Letter, *supra*, at 5. The reality is that most carriers, including AT&T, rely to a greater or lesser extent upon wholesale inputs from other carriers and the Congress expressly provided for non-incumbent carriers to compete in a variety of ways, including both on a facilities basis and through access to other carriers' network elements on a wholesale basis. *See generally*, 47 U.S.C. §251(c).

[67] In the *Phoenix Forbearance Order*, the Commission emphasized the dangers of making predictions without a sufficient factual basis, especially one that incumbent ILECs "even if not required to offer UNEs, would have an incentive 'to make attractive wholesale offerings,'" as it

(footnote continued)

If markets evolve and the statutory criteria for forbearance can be established, including a factual basis for concluding – after a proper geographic and market analysis – that an incumbent carrier no longer has market power in given markets, the Commission may forbear from requiring unbundling and perhaps other obligations in those markets. But the Commission cannot and should not dictate, by exercising predictive judgment without a solid factual foundation, when statutory obligations, and the regulations implementing them, will no longer apply. The AT&T Petition is wholly devoid of any specific geographic market-based evidence, let alone in markets generally, either that cable companies or other competitors have invested in "significant new deployment of competitive [access] facilities,"[68] especially in the business/enterprise markets. If and when circumstances change, AT&T and others are able to move for forbearance from their UNE (and or collocation) obligations based on market-specific market-power analyses and the appropriate factual basis, following Commission precedent and Congress' intentions. The Commission (and its Task Force) should not look for an end-run around that framework as AT&T proposes.

VI. AT&T'S CALL FOR SELECTED MARKET EXPERIMENTS IS FUNDAMENTALLY FLAWED AND A BAD IDEA

As explained earlier in these comments, the type of comprehensive proceeding proposed by AT&T is unnecessary, and AT&T has not demonstrated any factual basis to warrant such an

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had in its *Omaha Forbearance Order*. Phoenix Forbearance Order, ¶ 33(citing *Petition of Qwest Corporation for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Omaha Metropolitan Statistical Area*, 20 FCC Rcd 19,415 (2005)). The Commission explained how, in hindsight, its predictions regarding competition in the Omaha, Nebraska, market had proven to have been without factual basis, and there is "little evidence, either in the record or of which we are aware, that the BOCs or incumbent LECs have voluntarily offered wholesale service at competitive prices once regulatory requirements regarding wholesale services were eliminated." Phoenix Forbearance Order, ¶ 34.

[68] Phoenix Forbearance Order, ¶ 36.

undertaking. Many of the specific issues AT&T raises, albeit with limited discussion or analysis, are already before the FCC, as noted above. In addition, as amplified in this section, AT&T's conception of market-based experiments is not only unwarranted, but it carries the potential for tremendous harm to competition and, more importantly, consumers.

AT&T asks the Commission to open a rulemaking for the purposes of conducting "geographically limited trial runs" to test its theories about the limited, if any, role it believes the Commission should play in an all-IP PCN "before eliminating, on a nationwide basis, all of the counterproductive regulatory burdens" that AT&T alleges exist.[69] More specifically, AT&T recommends that the Commission elicit proposals "from ILECs" for specific wire centers to use as part of this "experiment" and detailed plans for conducting the trials, including the network modifications necessary to progress from the legacy TDM network to IP technologies and the retail and wholesale services it will offer in place of its legacy wireline services.

AT&T's proposal has many flaws. First, AT&T suggests that "within a year" of the inception of the proceeding selecting the markets to be involved in the experiment, the results of the trial runs should be assessed.[70] Practically speaking, AT&T is asking the Commission to make nationwide policy decisions based on, at best, a couple months of data derived from just a few wire centers. However, investments in network facilities are planned years in advance and may be implemented over even longer periods. In addition, contracts between carriers often have multi-year terms. A period shorter than several years, let alone less than a year as AT&T suggests, would be insufficient to gain any meaningful results, assuming for the moment the experiment otherwise had any merit.

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[69] AT&T Petition at 20.

[70] *See* AT&T Petition at 6.

Second, even if a brief experiment reflected industry reality, during this short period, the ILECs would have every incentive to be on their best behavior given the potential long-term upside for cooperating, which behavior would almost certainly lead to distorted results. Meanwhile, the finite period of the experiment would provide a relatively meaningless look at the potential for competition to continue and thrive in an industry-wide evolution to an all-IP PCN, as competitors cannot be forced to accelerate marketing efforts or investment decisions in the trial-run wire centers. Indeed, there is every reason to believe that the injection of the experiment into the wire centers selected would distort the competitors' behavior as well. Any decisions about the markets involved in the trial runs and how long the experiments would be in duration to see if they succeeded would, by necessity, be arbitrary. At best, the Commission may develop a few anecdotes. But in the end it would have little if any evidence relevant for sound policy decision-making.

Third, AT&T's trial run proposal, if adopted, would likely disrupt customers of the ILECs' competitors and potentially impose tremendous burdens on them without the Commission having first concluded that that the regulatory changes the experiment will test are justified. The experiments would likewise place considerable pressures on competitors to the extent their cost structure in those wire centers is upheaved by the withdrawal of specific wholesale inputs under regulated rates, terms, and conditions and the cessation of key regulatory obligations of the ILECs. For example, pricing of customer services within the experimental wire centers may have been predicated on the maintenance of the existing regulations promoting competition, or at least that any alteration of those regulations would be in a manner envisioned by Congress as previously implemented by the Commission. The experiments, without the sort of regulatory analysis undertaken in a forbearance proceeding or when the Commission

considers the scope of ILECs' unbundling obligations under Section 251(d)(2) of the Act,[71] may result in sharp cost increases for competitors and a substantial squeezing or elimination of operating margins, both with anticompetitive results. Competitors' investment decisions may be undermined as a result of the experiments. On the other hand, if AT&T's intent is to grandfather existing wholesale arrangements within the wire center, to avoid such undesirable results, that would appear to undermine the theoretical value of the experiment even further. Finally, AT&T seeks to have the Commission assert preemptive regulatory authority and run roughshod over the rights of states, all in the name of conducting this experiment. There would be no mechanism to undo the harms that would occur when AT&T's experiments prove unsuccessful or resources to put restore the markets to their former status.

In sum, the Commission should firmly decline to engage in the unfruitful and harmful program of experimentation that the AT&T Petition boldly advocates. This is not AT&T's call. Congress has already established a statutory basis for deregulation with necessary hurdles of proof – forbearance under Section 10. As part of that process, petitioners are required to bring evidence on how the markets are operating in the current regulatory environment to ascertain whether continued enforcement of the regulations is required. Apparently lacking evidence of its own at the moment, AT&T elicits the Commission's assistance in generating questionable evidence after the fact, by forbearing first and seeing what happens. The Commission should firmly reject AT&T's invitation to put the cart before the horse. The processes that the Commission has established for ILECs to pursue if they believe that certain regulations are no longer necessary are not broken. The Commission's thoughtful market-power analyses in its forbearance decisions are to be commended and should form the basis of future decisions.

[71] *See* 47 U.S.C. § 251(d)(2).

Even if the Commission were to take AT&T's select-wire center trial run proposal seriously – which it should not – it should first ask AT&T to provide more detailed information on what network modifications that AT&T believes are necessary to transition from its own TDM network components to IP technologies. AT&T has not done so, and so it is virtually impossible to evaluate the practicality of what AT&T suggests. The ILEC seems to expect the Commission – and the industry – to simply take AT&T's word for it.

Tellingly, AT&T did not propose that some markets be selected where, once the ILEC's network is all or substantially transitioned to IP technology, the existing regulatory framework remains in place or is modified to reflect the transition. If the Commission were to conduct an experiment, it would be necessary to have a control groups or comparison trial runs to meaningfully evaluate results. A successful experiment, assuming the many concerns identified above could somehow be adequately addressed, would require trial runs to be in place where the transition to IP networks has been implemented by the ILECs, but where the regulatory requirements that AT&T targets remain in place. AT&T's conception also allows for no examination of alternative regulatory/deregulatory paradigms advanced by others.

Without a control group, AT&T's theories about the harms that supposedly would result from maintaining the regulatory obligations in place would remain untested. To provide for meaningful comparative analysis, pairs of markets of reasonably comparable size, demographics, and competitive makeup would have to be identified within the territories of individual ILECs, and preferably in the same state. That may be impossible, because, as AT&T concedes, wire centers differ and affect "[t]he specific steps necessary to effect the transition, and the services that will be offered in place of legacy wireline services may vary depending on geographic and

other factors (e.g., terrain, population, and the plant in the ground)"[72] and no doubt many more that AT&T fails to mention, such as the mix and density of competitors using UNEs, collocation, interconnection, and other methods provided for by Congress in the 1996 Act to spur and sustain local competition.

Without making comparisons possible along the foregoing parameters, however, AT&T's experiment would not even qualify as an experiment. There would be no basis for helpful analysis of what regulatory obligations should be preserved because there would be no trial run "IP network" markets with regulatory obligations in place to act as a control or, in the case of alternative regulatory visions, as comparison. Markets where legacy TDM networks remain in place would not provide a proper comparison because, as XO acknowledges and describes above, the industry is evolving to an all-IP environment. At bottom, AT&T's experiments would become nothing more than a back-door justifications for removing its and other ILECs' regulatory obligations ahead of time in select markets in the hope that they can preserve their resulting gains in those markets after the fact.

[72] AT&T Petition at 21.

VII. CONCLUSION

For the reasons set forth herein, the Commission should deny the AT&T and NTCA Petitions and decline to enter into the comprehensive proceedings envisioned in those submissions. Instead, the Commission should resolve its other pending proceedings regarding competition policy and focus on establishing a framework to ensure managed IP-based interconnection is available on reasonable and nondiscriminatory rates, terms, and conditions to carriers such as XO that have invested heavily in efficient IP technologies.

Respectfully submitted,

XO COMMUNICATIONS, LLC

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January 28, 2013

ATTACHMENT A

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
AT&T Petition to Launch a Proceeding	)	
Concerning the TDM-to-IP Transition	)	GN Docket No. 12-353
	)	
Petition of the National Telecommunications	)	
Cooperative Association for a Rulemaking	)	
to Promote and Sustain the Ongoing	)	
TDM-to-IP Evolution	)	
	)	

DECLARATION OF RANDOLPH NICKLAS

1. My name is Randolph Nicklas. I am the Chief Technology Officer at XO Communications, LLC (XO), and the Senior Vice President of Network Engineering. I submit this Declaration in support of XO's Comments on the AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition in the above-captioned Federal Communications Commission (FCC or Commission) proceeding.

2. As XO's Chief Technology Officer, I am responsible for the overall network technology vision for the company's voice, data, and transport networks. I also advise on the overall design of XO's commercial and wholesale voice, data, and IP-based services. Previously, I was Vice President of Engineering, responsible for the design, implementation, and sustaining engineering of XO's transport, voice, and data networks. Before joining XO in 1999, I held engineering and technical management positions at Intelsat, Cisco, and MCI. I also have worked in the areas of software development and systems engineering on a variety of aerospace programs for NASA, Los Alamos National Laboratory, and Computer Sciences Corporation. I obtained B.S. and M.S. degrees in Applied Mathematics and an M.S. in Physics, all from the Georgia Institute of Technology. The description of XO's network below is true to the best of

my knowledge and belief, and is based on my experience and direct observation in the performance of my responsibilities and additional preparation in connection with submission of this Declaration.

3. I have reviewed the November 7, 2012, Petition for Rulemaking filed by AT&T with the Commission concerning the transition to all-IP networks. While AT&T is correct that today's telecommunications networks are in the middle of an ever more rapid transition to Internet protocol-based delivery of information, AT&T is wrong to the extent it suggests in its Petition that as a result of that transition there will be no distinct public switched telephone network (PSTN), or at least there will be no successor network that will be a functional superset of today's PSTN, what I will call the public communications network (PCN). AT&T is similarly wrong to the extent it suggests that a transition is underway leading to a consolidation of all networks – including the PSTN – into a single IP-based network, or an "IP ecosystem." The apparent faulty premise that shows throughout AT&T's Petition is that the use of IP somehow inherently means that an IP-based network is fundamentally part of, or is inextricably connected to, the Internet, so as to be somehow indistinguishable from the Internet.

4. As I will discuss herein, the Internet is just one of many IP-based networks that carriers use today, including AT&T. Indeed, even Internet traffic is often off-loaded onto private IP networks. For example, many large Internet content and application providers on- and off-load tremendous amounts of information onto the Internet using content delivery networks (CDNs). This approach is critical for high-speed, high-performance websites for which sole reliance on the Internet is not operationally feasible.

5. Moreover, IP networks distinct from the Internet, including the PCN, will be with us for some time, even if their existence is characterized as much, or even more, by virtual

distinctions as by distinctions in physical facilities. Consequently, regulation of an IP-based network that is not the Internet, such as the networks XO and other providers use for managed IP communication services, *does not equate to the regulation of the Internet.*

6. Equally important, as AT&T and other incumbent local exchange carriers and their affiliates move to all-IP networks – following the lead of XO and other competitive carriers – the world will not suddenly change such that the ILECs will lose market power. AT&T and other incumbent carriers, even though they are no longer monopolies and inroads have been made into their once-overwhelming market shares, retain significant market advantages in both retail and wholesale markets, especially for business and enterprise services. This market power is a result of the extensive scope of facilities-based connections they have to end user locations. (In markets for residential services, cable operators and wireless providers have made significant inroads and may, in some geographic locations, have eroded the incumbents' market power for such services in a meaningful way. XO does not serve residential markets.) Evolution to all-IP networks will not lessen this distinct market advantage enjoyed by AT&T and other incumbent LECs. Control of these connections to customers, even if they are used by other carriers to provide last-mile connections through wholesale arrangements, is the source of market power in the product markets supported by those access connections. In other words, the ILECs in owning and operating their IP networks characterized by unparalleled facilities-based access to commercial and institutional buildings and campuses will inherit the market power they have today, due to their control over these key network access facilities and extensive customer relationships.

7. As a result of the foregoing, in order to provide competitive services and offer consumer choice, XO and other competitive carriers will remain dependent upon interconnection

with and access to the network elements of the PCN, especially those portions controlled by the ILECs, even after their transition to all-IP transmission. XO has invested huge sums over the past seventeen years to build extensive state-of-the-art fiber-based metro networks in large and mid-size markets across the country, with current speeds up to 100 Gbps. The scope of XO's physical network facilities are among the most extensive of competitive telecommunications carriers today. Despite these large and ongoing investments, XO still requires access to the incumbents' copper-based access network facilities, and successor access networks, as well as their component last-mile facilities, in order to reach individual buildings and customers as a provider or, through interconnection arrangements, on behalf of XO's customers communicating with the customers of other carriers at those locations. XO requires interconnection with the ILECs and other providers to extend its services fully within the markets where XO is present and to connect its users to the rest of the country and around the globe. This is true today, and there is no reason that the mere transition to a new network technology – IP – will alter that fact.

8. Although XO's managed IP network is more efficient than its circuit-switched based forbears, the use of IP technology does not ensure that XO can be a robust competitor going forward without the rights to access the networks of incumbent LECs that were created by the 1996 Telecommunications Act amendments to the Communications Act of 1934. Again, I want to emphasize that, by advocating that these obligations continue to apply to ILEC network elements and interconnection with their networks, I am not advocating for the regulation of the Internet itself.

9. The starting point of AT&T's position is its observation that today's networks have begun to evolve and are continuing to evolve toward all-IP networks. I agree, but it is important to put the present evolution into a broader perspective to realize that, while the

technologies are new, the fact of network evolution is not. Ultimately, I would suggest, AT&T's observation about network changes is unremarkable from a regulatory perspective. The current network evolution does not justify a sharp break in regulatory frameworks, as AT&T contends, although it may require the Commission to reconsider how it regulates in light of the present and anticipated changes in technology and network evolution.

10. Communications networks have been continually evolving for decades, essentially from the very beginning. Early public voice networks used human operators to switch calls between end users until, by the 1940s, hundreds of thousands of people were employed as operators by AT&T alone. By this time, the automatic branch exchange, which dispensed with the need for a human operator by using a series of electromechanical switches, had already been introduced. Automatic exchanges in time offered global access to a single public telephone network via a universal "dial tone" over which one subscriber could reach any other on the same or an interconnected network by waiting for an audible "dial tone" and then dialing the number of the intended called party, without any human involvement whatsoever. The first digital telephone exchanges were introduced at the beginning of the 1980s, allowing digital (tone) dialing handsets to replace the rotary dial telephones. More recently, networks have introduced soft switches which increasingly replace digital switches as networks rely more and more on IP telephony. IP telephony is one type of packetized transmission. A soft switch is typically used to control connections at the junction point between circuit-switched and packet-switched networks, but calls that begin and end in IP on managed IP networks also are routed via soft switches and related IP-based network elements such as session border controllers (SBCs).

11. As the switching used in networks has evolved, so too have the transport and signaling technologies. Copper facilities are being largely replaced by fiber, both for interoffice

trunking and for the last-mile to subscribers. Yet copper has an important continuing role to play as networks are upgraded and IP technologies are introduced. Copper facilities that were used for TDM telecommunications decades ago are now, on XO's network for example, providing Ethernet connections at up to 100 Mbps which enable IP voice telephony, among other advanced services. Contrary to what some might believe, fiber optic connections are not a prerequisite for IP or packetized communications.

12. Network architectures, too, have changed. Hub and spoke copper-based networks of the ILECs, constructed before local competition was introduced, have been replaced by fiber-ring and mesh-based network architectures, with the new competitors leading the way. From its start in 1996, XO has built its backbone, both its metro networks operating within single metropolitan areas and its inter-city network, using fiber. But farther out toward the edge of the network, many subscribers are served today utilizing Ethernet-accelerated copper, allowing for significant throughput for IP-enabled services.

13. As the PSTN moved from analog switches to digital switches, different forms of signaling had to be used to manage the networks and to set-up and complete calls. Multi-frequency (MF) or in-band signaling was used with analog switches, but with the introduction of digital switches, a much more sophisticated type of out-of-band signaling, SS7 (or Signaling System No. 7), became available. SS7 carried the signaling information on a separate channel from the call itself and made possible number translation, local number portability, prepaid billing mechanisms, short message service (SMS), and a variety of other mass market services that were not possible with MF signaling.

14. Now, and most pertinent to the issues at hand, over the past seventeen years or more, an increasing amount of voice traffic is being carried in whole or in part using what is

called Internet protocol or "IP." The carrier networks that carry managed IP voice should not be conflated with the Internet, as IP technology pre-dates the Internet and today is used on a variety of networks apart from the Internet. Indeed, even traffic from "over-the-top" IP voice services, such as Skype and Vonage, which rely on a broadband connection, typically do not stay entirely on the Internet, as any given call may be terminated to a phone that receives its calls by virtue of a connection to the PSTN. (Such services are prone to suffer from quality of service issues because they utilize the Internet for some if not all of the call path. No facilities-based provider of manage IP voice service, to my knowledge, offloads any of its traffic onto the Internet for transport, rather than using a managed network, because that would expose the traffic to the Internet's weaknesses as a "best efforts" network. I should note that XO is developing its own version of over-the-top VoIP and is well acquainted with such services' limitations and unsuitability for certain classes of customer, including large businesses and enterprise customers. Moreover, while XO has and continues to terminate on its managed VoIP network VoIP traffic that has been routed in part over the Internet, *e.g.*, over-the-top originated VoIP, XO cannot restore that traffic to a quality level commensurate with XO's managed VoIP service, even though the traffic may pass through its SBCs and, from that point, be handled by XO in the same manner as its managed VoIP traffic.) So while a broadband connection is necessary for both facilities-based managed and over-the-top VoIP service, the managed IP voice service, with its call quality guarantees, is handled in a manner distinct from over-the-top VoIP traffic. That distinction is critical because it eliminates the effects of packet-loss on real time, two-way communications – a syndrome to which callers are exceedingly sensitive and expect to be minimal, if not absent, in any business grade quality call.

15. XO has a network that carries Internet traffic that is connected with other peering partners' networks that do the same. By the same token, XO has managed IP-based network facilities for voice traffic, video traffic, and a variety of other applications which are partitioned from and distinct from the network paths that XO uses to carry the Internet traffic. Further, XO relies on the IP-based networks of other carriers, such as AT&T and Verizon, to obtain wholesale inputs for its managed services, such as IP-based voice traffic transport. XO knows from these transactions that the managed IP voice traffic of these carriers does not traverse the Internet. Moreover, as explained in the Declaration of Ramani Pandurangan, XO has established managed IP interconnections, although on a limited but more frequent basis, with a number of other carriers.

16. XO's and my experience with managed IP-based networks distinct from the Internet underscores that IP describes a type of technology, not the Internet itself or any specific network. In fact, the same network connections (copper and fiber) that handled traffic in the 1980s today carry IP traffic by virtue of investments in the network switching equipment, not a wholesale rewiring of America. IP technology arose decades ago, long before there was an Internet as we know it today, as one of a number of competing solutions by which computers could talk with each other over a communications network. In general, all of these methods were based on packet-switching. In short, the packets each included source and destination addresses, among headers and other pieces of data designed to aid in the packets' transmission between the computers and for their reassembly, in addition to the payload information making up the communication itself (or at least each packet's portion of the communication). IP is a specific communications protocol distinguished by its addressing scheme and a packet format developed wholly independently of its most commonly known use today, the commercial Internet. IP is

suited for that use, however, because it bridges the gap across different protocols as a single, higher-level protocol.

17. The Internet itself was a particular packet-switched *network* solution to the quest for means by which computers could communicate with each other. Specifically, the Defense Advanced Research Projects Agency (DARPA) helped launch what would become the Internet when it looked for a means to link time-sharing computers into a national system, establishing a network (ARPANET) permitting remote log-in to share computer resources. Not long after, in 1981 the Computer Science Network (CSNET) was launched and managed by the National Science Foundation (NSF) for the benefit of academic institutions that did not or could not have access to ARPANET, followed in 1986 by NSFNET. NSF anticipated a network twenty-five times faster than CSNET and connected existing NSF-created regional networks and local academic networks, as well as DARPA's own internet, which included the ARPANET. In 1995, NSF ceased its financial support of the principal Internet backbone, NSFNET, hastening the rapid commercialization of the Internet, which eventually evolved into a collection of interconnected commercial IP networks operated by a number of facilities-based carriers and Internet Service Providers. Although more extensive, dense, and sophisticated than its predecessors I just described, the current Internet bears a fundamental resemblance to these incarnations as a network of networks and the computers which subtend those networks. A distinguishing factor of today's Internet from its commercial infancy in the mid-1990s is the burgeoning host of content and applications on the world wide web, which is itself an application riding on the Internet. Chief among the resemblances is that today's Internet is at least logically distinct from the networks of XO and other carriers that comprise the PCN and by which, for example, their voice subscribers talk to each other.

18. At around the same time the Internet was being launched, XO, in 1996, commenced to install its telephone networks using Nortel DMS (circuit) switches, metro fiber rings, transport equipment to light the fiber rings. Along with this, access to unbundled ILEC network elements and interconnection with ILEC networks became available through the 1996 Telecommunications Act and the associated FCC regulations. Access to unbundled network elements (UNEs) provided an essential complement to the XO-installed fiber facilities and electronics, and XO was able to reach customers to which its own network otherwise did not provide access. Just three years later, in 1999, XO commenced construction of its own IP infrastructure through edge routers providing Internet access through T-1 connections. The edge routers allowed XO to take traffic on and off the Internet, but XO did not at the time have a national Internet backbone.

19. In the years since, XO has installed backbone facilities, connected its routers used to provide Internet access service, and become a full-fledged Tier 1 Internet peering provider connected to other such providers both locally and regionally as well as worldwide. XO is one of the largest thirteen Internet backbone providers in the world, and the fourth largest in the US. *See http://www.renesys.com/blog/2013/01/a-bakers-dozen-2012-edition.shtml*. XO has also installed numerous additional routers and soft switches which have aided its transition to all-IP networks. Today, XO operates a managed IP network that is used to support its provision of managed IP voice and IP video, to name two examples, and this network is distinct from its Internet IP network because of the real-time operational needs of the former services. While the Internet and managed IP-based voice traffic use the same basic packet switching technology, they are differently configured, the addresses on the networks are fundamentally different, and the networks involved are operationally firewalled from each other, even if they might use some

of the same physical facilities, such as fiber or copper loops to customers that purchase both voice and Internet access services. This is the case for virtually all carriers, not just XO.

20. In conjunction with its managed IP voice network, XO still operates most of its Nortel switches. XO is not unique in this regard, as all carriers maintain substantial elements of their TDM architecture. Based on what I have seen as a result of XO interacting with other carriers and their networks, the TDM architectures, as an important element of PCNs, are not going away any time soon. AT&T, for example, still operates a large number of TDM voice switches. Nonetheless, it is the case that carriers are not making any material investments in TDM technology today. Carriers are using what TDM facilities they have in place and directing capital dollars elsewhere, e.g., fiber, wave division multiplexers, Ethernet and IP/Multiprotocol Label Switching (MPLS) switches, and other adjuncts to IP networks such as soft switches.

21. XO remains dependent upon the unbundled elements and special access facilities of AT&T and other ILECs. Today, for approximately 85% of its customers, XO relies upon leased access to last-mile facilities to provide its services or its portion of the services when one of the parties to a service is served by another carrier.

22. While XO has an increasing reliance on its managed IP networks in the provision of voice services and has sought to interconnect in order to exchange managed voice traffic in IP format, it has had only limited success, as explained more fully in the Declaration of Ramani Pandurangan. (In addition to managed IP interconnection arrangements, XO is decommissioning Feature Group D trunks and, ideally, moving the traffic to IP-based interexchange entrance facilities with some large interexchange customers or, alternatively, to third-party carriers maintaining their TDM-based transport, at least for now). XO's difficulties in this regard are directly the consequence of no clear regulatory directive from the FCC requiring managed IP

interconnection when a carrier requests it, under any circumstances, regardless of who the other provider is or whether it retains market power. In some cases, XO has been able to negotiate indirect managed IP interconnection when direct interconnection arrangements could not be reached. To exchange managed IP voice traffic with one large US residential broadband provider, for example, XO has had to establish an indirect connection through a foreign-owned Internet service provider. Direct connection to the private managed IP networks of other voice carriers is preferable and would result in less loss of data and better quality of service (QoS).

23. As I explained above, IP-based networks that carry managed IP voice should not be conflated with the Internet (a "best efforts" network). Indeed all managed services that require certain functionality beyond the pure distribution of packets – commonly the need for real-time two-way (or multiple-way) high-fidelity communications will require end-to-end prioritization – will continue to require that management going forward. The Internet, as currently operated, cannot provide such prioritization. Prioritization is managed on a provider-specific, bilateral basis. So, if high-quality IP voice is being provided, as businesses and enterprises demand, it is being provided using private managed IP networks. Other applications requiring management of packets rather than simply "best efforts," which the Internet offers, are live video, healthcare and education, among others. To provide that management, specific electronics may not be required over time, but the functionality will have to be fully present. It is that functionality which distinguishes the managed IP-based networks of today from the Internet more so than physical facilities dedicated to a single network. But the isolation of the resulting networks, even if the boundary is virtual, is no less real for that.

24. The physical and virtual PCN will continue to exist because it is the basic building block of the nation's communications infrastructure – the network through which all

end points can be reached, and it will be distinct from the Internet. Just as MPLS allows multiple networks to be overlaid on top of each other using different network protocols, the Internet and managed IP networks used for voice and other applications will remain distinct. This use of MPLS-based networked virtualization of IP networks is a technique used by most large IP network operators, including AT&T and XO. Even with an all-IP PCN, those carriers with the most extensive access networks reaching the most end users or those that control limited facilities connecting end users will retain the greatest advantage and market power. Those carriers that enjoy this today will do so with an all-IP PCN, too, including current ILECs, as their access advantage will be transportable into the future environment, as I explained earlier. Accordingly, protection of competitive alternatives will require both interconnection and access to UNEs in an all-IP environment, just as it was required with the TDM networks of the PSTN.

25. The regulations involving interconnection and network access today provide a good starting point for the Commission in fashioning rules for our IP-based future PCN. At the same time, there are sure to be differences. For example, the density of interconnection points a carrier may need with ILECs should drop considerably in an all-IP PCN where the old geographic concepts, such as LATAs, may have no meaning for purposes of interconnection or switching. Moreover, ascertaining how to make virtual access connections (Ethernet Virtual Circuits) necessarily available for telecommunications services may be as challenging to define as the new UNEs. But even as that may be, the Commission should determine these matters after input from the industry through a rigorous analysis in its rulemaking processes, not through action in response to "one-size-fits-one" petitions as IP transmission becomes ubiquitous across platforms and networks, as AT&T contends. And although implementing adequate regulation

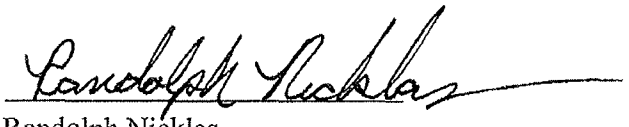
may be challenging in changed circumstances, if it has to be done to preserve competition levels, the Commission will be in a position to tackle it.

CONCLUSION

26. As discussed herein, the Internet is just one of many IP-based networks that carriers use today, including XO and AT&T. The Internet is distinct from IP networks that are used for managed services, such as managed IP voice and IP video. These managed services require the networks to ascribe certain prioritization markers in the packets and other network configuration parameters to ensure end-to-end quality of service. By contrast, the Internet is purely a "best efforts network." Accordingly, whether it is called the PSTN, the PCN, or by some other name, there will be a nationwide interconnected network distinct from the Internet for the indefinite future upon which carriers will exchange traffic and that will allow the completion of quality voice calls and other interactive communications from one end user to another. The market power and other advantages that ILECs enjoy, resulting from extensive facilities-based access to customers, will also persist in the future as the transition from the legacy TDM technologies to IP-based technologies continues. Accordingly, competitors will remain dependent upon managed IP interconnection with and access to the network elements of AT&T and other ILECs, even after the evolution to an all-IP PCN. The need for this access and interconnection, as provided for by Congress in the Telecommunications Act of 1996, will not change as a result of the change in technology.

I declare under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

Executed on January 28, 2013



Randolph Nicklas

ATTACHMENT B

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
AT&T Petition to Launch a Proceeding	)	
Concerning the TDM-to-IP Transition	)	GN Docket No. 12-353
	)	
Petition of the National Telecommunications	)	
Cooperative Association for a Rulemaking	)	
to Promote and Sustain the Ongoing	)	
TDM-to-IP Evolution	)	
	)	

DECLARATION OF RAMANI PANDURANGAN

1. My name is G. (Ramani) Pandurangan. I am Executive Director, Network Engineering at XO Communications, LLC (XO). In that position, I am responsible for architecture, technology, planning and engineering for Applications over Internet protocol (IP), including, for example, voice, video, and data, among others. Over the last twelve years at XO, I have led the architecture, design, testing and implementation of Voice over IP (VoIP) technologies and platforms across the XO network. Working closely with XO's marketing team, I have guided the development of several award-winning XO VoIP products, such as Enterprise SIP trunking and IP Flex.

2. Prior to joining XO, I held various technical and management positions in Engineering, R&D and Marketing at Teleglobe, an international telecommunications carrier. At Teleglobe, I oversaw the introduction of technology strategies of Intelligent Networking, common channel signaling and digital switching, and new services in North America and in

overseas countries. Before joining Teleglobe, I was an architect and designer of operating system and data communication software for Canadian National.

3. I have participated in several standards bodies including ATIS and ITU. Among the standards I participated in are Common Channel Signaling and Telecom Management.

4. My declaration explains XO's need for interconnection arrangements for its managed IP communications services (including IP voice and video, as two examples) for business and enterprise customers that are distinct from the interconnection arrangements that XO maintains as an Internet peering company, due to Quality of Service (QoS) and other considerations. Managed services use various techniques to maintain QoS by protecting against impairments resulting from factors such as bandwidth contention, latency, jitter, and packet loss among other factors, whereas Internet transport and traffic exchange is on a "best efforts" basis. I also discuss how many of XO's IP network facilities that support its managed IP communications services for business and enterprise customers are separate from those that carry Internet traffic. XO is developing an over-the-top VoIP offering, which will not, by definition, offer the QoS and other features, e.g., security, that, in XO's experience, business and enterprise users demand and which XO is able to provide through its managed services that ride on XO's managed IP network facilities.

5. Two decades ago, when competitive telecommunications carriers, such as the predecessors of XO, first entered the market to provide circuit-switched telephone service, interconnection with the existing monopoly telephone local exchange carriers was necessary to ensure that any party could place a call to anywhere on the public switched telephone network. Without interconnection a new entrant could not provide subscribers with connections to the

customers being served by other carriers, which would effectively balkanize the US telecommunications infrastructure, at best, and totally frustrate competitive entry, at worst.

6. Since there was no economic incentive for the monopoly telephone companies to enter into reasonable interconnection arrangements with prospective competitors, the present legal and regulatory requirements obligating the former monopoly local telephone companies to interconnect on reasonable and non-discriminatory terms was required. Absent this interconnection regime, it is unlikely competition would have advanced to where it is today. Interconnection of circuit-switched networks pursuant to regulatory obligations, despite the passage of time and appreciable inroads by competitors in the marketplace, is still essential. The former monopoly telephone companies still, without question, have the most ubiquitous connections to end users (whether their current customers, subscribers of their wholesale customers, or their former customers), especially in the large business and enterprise markets, and are the primary entity with which XO competes in the geographic and product markets XO serves.

7. For XO and other carriers that provide Internet protocol-based (IP-based) services, such as managed IP voice, that are replacing circuit-switched services, interconnection with the ILECs is equally necessary today and for similar reasons – the ILECs have the most extensive network reach to end user customers and have the greatest number of interconnections with other carriers. This market power gives the ILECs incentives to seek ways to curb their interconnection obligations.

8. The most efficient form of interconnection with other providers for a carrier that provides managed IP-based services, such as XO, is interconnection in IP format ("managed IP interconnection"), principally because the carrier need not convert the traffic to another format,

typically time division multiplex (TDM) format. IP-based services are best served by GigE transport, both internally within the network and over interconnection facilities, which is more economical than TDM-based transport. Accordingly, managed IP transport and interconnection enables the carriers providing IP-based connections to offer their subscribers the benefits of IP transmission all the way to the handoff resulting in lower overhead, a more robust QoS, and a broad suite of features. In addition, there are no costs of conversion for a carrier offering IP-based services and using managed IP transport within its network when interconnection is in IP. On the other hand, where a carrier that offers IP-based services is forced to exchange traffic with other carriers in a different format, such as TDM, the carrier must maintain burdensome, costly and unnecessary overhead in engineering design, network planning, mediation and billing, and potentially maintain duplicative interconnected circuits with either the other carrier's end office switch and/or tandem switch.

9. At this juncture, because of the special requirements of managed IP voice and other managed IP communications services I describe above, especially for business and enterprise users, which I explain in more detail below, the managed IP interconnection arrangements for such services do not have any connection to the exchange of Internet traffic. While the exchange of Internet traffic also occurs in IP format, IP traffic for business and enterprise users, among others, are unlikely to ever touch the Internet, because they are carried on one or more of the many managed IP networks (and networks of managed IP networks) that are completely independent from the Internet.

10. The term "Internet" in Internet protocol derives from the function of the communications protocol, not what we have all come to know today as "The Internet." More specifically, IP format allows the function of routing packets that enables *internetworking*,

something critical for The Internet, but a function whose benefit is by no means limited to The Internet and the traffic carried over it. The nature of the communication using IP format is determined by the actual information being exchanged and any behaviors defined by the specifications imposed on the packets and the network, as I explain later. To conflate the Internet and the managed networks carrying IP-based services would be a serious mistake. Similarly, to confuse Internet peering with managed IP interconnection, for managed IP-based services would simply be wrong.

11. Managed IP interconnection is not limited to services that originate and terminate in IP. In some cases, traffic may originate or terminate from and to subscribers, respectively, in a format different than that in which it is exchanged. XO, for example, offers high-quality voice service both over IP connections and TDM connections today. Increasingly, more of XO's customers take IP-originated voice service, *i.e.,* managed IP voice, as XO progresses toward an all-IP network. Where customers' traffic still originates in TDM format today, it is necessary for XO to convert the traffic to IP format (at a softswitch) if the call will either terminate to an XO customer with a managed IP-based telephone service or will be exchanged with a carrier with which XO has managed IP interconnection. (Similarly, when traffic originates or is handled by XO in IP format but is destined for one of its subscribers that still is served by a TDM access connection, XO must convert the traffic to TDM format before completing the call.) The need to convert the traffic provides both economic and technical incentives for XO to migrate its remaining TDM customers to a managed IP platform and seek managed IP interconnection wherever possible. Until that migration is complete, there will remain a residual, but ever dwindling, need for XO to convert traffic to and from IP. Indeed, where it makes sense, because of the benefits and efficiencies of managed IP transport, XO may convert TDM-originated traffic

to IP to bring it to the destination market, even if it must convert it back to TDM format before handing it off or exchanging it.

12. Two of the predominant types of IP-based interconnection today facilitate the exchange of very different types of IP-based traffic: managed IP voice traffic and so-called "best efforts" Internet traffic (including over-the-top VoIP). Today, XO has interconnection arrangements of both types with multiple providers.

13. However, XO's experience with IP-based interconnection for managed IP voice traffic has been mixed. XO has sought and entered into IP interconnection arrangements for managed IP voice traffic with a variety of carriers. Not all providers of voice services that XO has approached to establish managed IP interconnection arrangements have been willing to enter into such arrangements.

14. XO's experience with IP-based interconnection bears out what I explained above. None of XO's peering arrangements for the exchange of Internet traffic is used to exchange managed IP voice or other managed IP-based services traffic. Users and carriers do not expect Internet traffic to have the same quality as managed IP voice. This serves to underscore, as a practical matter, that managed IP interconnection and Internet peering are two very different types of interconnection with differing network and operational needs.

15. To explain that, I need to step back for a moment. To ensure the successful exchange of information between devices on a network, such as digital telephones and computers, to name two examples, rules and conventions must be established that allow the devices to communicate with each other. The same can be said of the exchange of information between two or more networks. Such rules and conventions, set forth in a technical specification, are termed a communication protocol standard. That standard characterizes the

information that is sent on the network, whether it be in packets, over temporary dedicated circuits, or otherwise.

16. Two devices or networks must agree upon, understand, accept, and use the same set of rules and conventions to be able to talk to each other. Or there must be a capability between the devices or networks that can convert the information from the protocol one device or network can understand and use to the protocol the other device or network can understand or use. Internet protocol is, generally speaking, one such standard or suite of standards. Signaling System No. 7 (SS7) and asynchronous transfer mode (ATM) are among numerous other protocols or protocol suites.

17. However, in the case of two networks that wish to exchange traffic, agreeing simply on the communications protocol standard of the information – meaning a "best efforts" exchange and routing of traffic – may be insufficient to meet QoS objectives. Depending upon the nature of the communication and its requirements, the parties must agree that the information they exchange will contain certain additional parameters in order for the exchange to be successful and QoS requirements to be satisfied. To maintain the preferential treatment and QoS of such services, agreed-upon parameters would have to be established for each hop between providers the packets make between the calling and called party. Dedicated managed IP interconnection arrangements between carriers facilitate the exchange of voice traffic between providers on a preferential basis. In contrast, while VoIP packets may be transferred over Internet peering arrangements for over-the-top VoIP services, this transfer is subject to "best efforts" exchange and routing.

18. Over-the-top VoIP services fall far short of satisfying QoS requirements of most business and large enterprise users, as well as many residential users. XO itself is developing an

over-the-top bring-your-own-bandwidth VoIP option and knows firsthand the marked difference between that type of best-efforts product and the managed IP voice products it offers, and the clear lines between the acceptability of one versus the other for certain classes of customers. The differences between over-the-top VoIP and managed IP voice goes beyond the interconnection arrangements that are required, as managed IP voice service involves much greater control over the routing of the traffic. Once over-the-top VoIP traffic hits the Internet, there is minimal control over how the packets are routed, whereas with managed IP voice, XO sets up calls using VoIP lines and trunks in a way that bears a closer relationship to the way XO provides services over TDM facilities than the way a carrier provides service on an over-the-top basis. XO's managed IP voice retail customers are connected to XO's network on specific VoIP access, XO handles all the signaling (SS7 on the PSTN side and SIP (Session Initiation Protocol) on the VoIP side), XO converts voice from TDM to IP or vice versa, as necessary, XO transcodes the traffic if necessary, and XO controls sending the voice packets on access or interconnection (direct or indirect) facilities specific to the called customer or that customer's provider, respectively.

19. Packet parameters that ensure preferential treatment and QoS for managed IP voice include SIP protocol elements, methods of transport, compression standards, coding standards, signaling standards (needed to set up the calls for billing and to route them), and encryption standards. Other parameters allow IP-based traffic, as necessary, to be given certain priority over other traffic or to be handled in special ways that would not otherwise be possible. Without these added parameters, the traffic would simply be exchanged on a "best efforts" basis, which, depending upon the application and needs of the customer base may be perfectly acceptable.

20. It is absolutely essential when managed IP voice traffic is exchanged that the two network operators clearly agree on a set of such parameters. Otherwise, the real-time nature or, more generally, the QoS of the voice communications would be undermined. If the parameters of what one carrier sends and another carrier expects to receive are not matched then, for example, calls may not be handled correctly and fail or calls may be set up but may have impairments. The same could be said for other traffic flows as well, such as live video calling, where QoS is important, *i.e.,* inherent in the nature of the communications.

21. Conversely, Internet traffic has no need for such parameters and the traffic is routed and exchanged within and between networks on a "best efforts" basis. The communications carried over the Internet can rely upon methods such as buffering and storage recall and forwarding to satisfy the customers' expectations, techniques which would defeat users' expectations regarding two-party or multiple-party, real time interactive voice communications. The exchange of Internet traffic is not subject to the same controls as managed IP voice traffic because QoS and real-time capabilities are not important. For this reason, the two types of traffic, even though they both use IP format and may even use the same physical facilities, do ***not*** share the same interconnection arrangement.

22. While the way in which managed IP voice and video calling traffic is managed may evolve over time (e.g., the functions of the Session Border Controller (SBC) may be integrated in the router or another managed IP voice network element), management will still be critical and involve essentially the same types of parameters as I outlined above. In other words, despite future evolution of networks, I expect that the way in which managed IP voice traffic is handled should indefinitely remain fundamentally distinct from the way the Internet traffic exchange is managed.

23. I use the network diagram that is an Exhibit to this Declaration to illustrate the points I have just made in more detail. The diagram conceptually illustrates the general flows for a variety of XO services: TDM-originated voice, managed IP voice, managed IP video calling, and Dedicated Internet Access. Each of these services (regardless of technology) is provided, to a greater or lesser degree, over many of the same physical XO network facilities, but each is separately managed and monitored (except for the Internet traffic which is managed in a fundamentally different manner, *i.e.*, "best efforts"). This partial sharing of physical infrastructure enables XO to gain efficiencies, lower cost, and accelerate the creation and implementation of innovative services, but it does not detract from the reality that more than one network path is involved, essentially creating two different networks sharing some of the same facilities.

24. The XO IP Flex offering, which is not specifically shown in the diagram, provides an example of how XO uses common physical infrastructure to provide different services while maintaining different operational (service performance and quality) parameters for each one so as to keep each distinct operationally in every meaningful sense. In reality, while the same physical facilities are used for a meaningful portion of the different services, the same facilities provide the components of what are operationally two different networks.

25. An XO IP Flex business customer, for instance, may subscribe to managed IP voice and Dedicated Internet Access services (both of which are shown in the diagram, albeit depicted as different customer access lines for illustration purposes) and connect from its premises to the XO network over a T1 or Ethernet over Copper/Ethernet over Serial physical facility that carries packets for both types of traffic. The packets for each service are segregated at an XO router by virtue of information contained in each packet. Thus, managed IP voice

traffic, when it leaves that router, as shown in the diagram, goes over facilities dedicated to managed IP voice communications traffic. When that traffic is destined for exchange with another provider, it is sent to an XO managed IP voice network element, SBC, and finally another XO router, before being exchanged over the managed IP interconnection trunks, typically a GigE facility. It then is passed to another provider's router over the managed IP interconnection arrangement established specifically to exchange that type of traffic. The details of that carrier's architecture and routing are not shown because they are not relevant to XO's purposes once the traffic has been exchanged. Moreover, they are specific to the network of each other carrier.

26. Exchanged managed IP voice traffic packets contain a series of parameters agreed upon by both parties, as I explained above, that are attached to ensure that the traffic is treated preferentially and otherwise exchanged so as to maintain the QoS. It is possible that some of the parameters are present before they reach the SBC, as XO may use the agreed upon parameters within its own IP network. XO's SBC prepares the traffic for the exchange, as necessary, ensuring the agreed upon parameters are present and adding them if necessary. One SBC may be used for interconnection with multiple carriers. (If the managed IP voice interconnection traffic flow was in the opposite direction, XO's only concern with the other carrier's voice traffic would be that it is exchanged reflecting the agreed upon parameters to ensure a successful exchange.)

27. By contrast, Dedicated Internet Access traffic, as shown in the diagram, goes directly from an intermediate XO router, where it is segregated from managed IP voice traffic, to another XO router or series of XO routers before being exchanged on an IP peering (or transit) basis with another carrier as it proceeds on a "best efforts" basis over the Internet. Unlike the managed IP voice packets, the Internet packets do not contain the markers corresponding to a set

of parameters because that is unnecessary for their exchange and the successful delivery to their destination on the Internet or at the terminal of an Internet user.

28. Another smaller business customer may subscribe to TDM voice and Dedicated Internet Access services – two different services using two different technologies but traveling over the same last-mile access connection and using a number of the same XO network facilities. Here, because the call originates using TDM technology, XO must first convert it at one of its soft-switches to an IP transmission stream. The voice traffic, once converted, becomes managed IP traffic and then travels over the same network path as managed IP voice traffic.

29. The Dedicated Internet Access traffic from this customer is sent directly to an XO router and then to Internet transport and interconnection facilities via Internet peering arrangements, as described above in the case of an IP Flex customer.

30. In sum, managed IP voice interconnection and Internet peering, while both are forms of IP interconnection, are fundamentally different and occur on distinct architectures. In addition, each interconnection, even if between the same two carriers, connects two different pairs of network paths, which may be a physical or virtual difference, at the point of interconnection. If the difference between the managed IP voice and Internet networks are virtual, the distinctions are no less real. Moreover, the traffic itself exchanged over each of the two interconnections is fundamentally different in each case, reflecting the managed nature of the managed IP voice communications versus the "best efforts" nature of the Internet communications.

I declare under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

Executed on January 28, 2013

Ramani Pandurangan

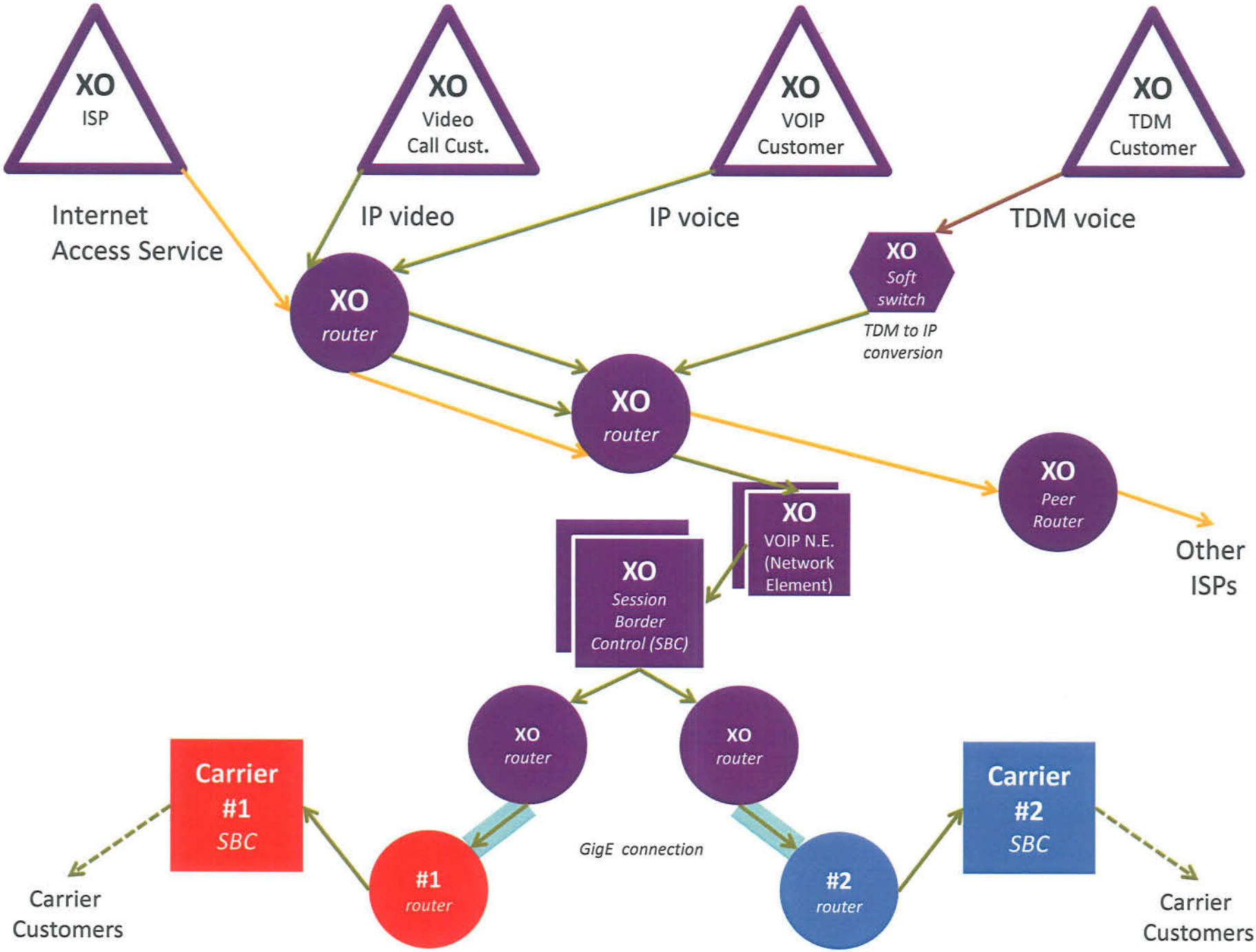


Exhibit to Declaration of Ramani Pandurangan